TE SEM - VI (Old)
Radar Engg (Elective) / Extc / VI / Old
27-12-2016

Sub :- Radar Engg

Q.P. Code : 587500

(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) State the important feature of Radar. Explain the basic principle of Radar System with block schematic.
   (b) What do you mean by Doppler ambiguity? Explain in details.
   (c) Write notes on, staggered PRF.
   (d) A VHF radar at 220 MHz. has maximum unambiguous range of 180 nmi, what is the first blind speed?

2. (a) How range to target can be calculated in Pulsed Radar? Explain, what do you mean by Maximum unambiguous range? **10**
   (b) What do you mean by threshold detection? Define the terms 'False Alarming' and 'Missed detection'. **10**

3. (a) What is RCS of target? Describe the RCS of Simple spherical target. **10**
   (b) What do you mean by Clutter? What is Doppler effect? Derive the equation for Doppler shift. **10**

4. (a) Draw and Explain the block schematic of MTI radar. **10**
   (b) Explain, how blind speed problem can be resolved. **10**

5. (a) What are the drawback of simple CW Radar and CW-IF Radar? How it can be overcome by FMCW Radar? **10**
   (b) How the drawback of clutter attenuation problem is overcome by Double delay line canceller ? What is MTI improvement factor in this respect ? **10**

TURN OVER

6. (a) Draw a Block diagram for M.T.I. 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) Radar Displays

(b) Jamming and anti-jamming of Radar

(c) MTI improvement factor

(d) Land Clutter

VP/EXTC/VII/CBSGS

27-12-2016

Sub:- VLSI Design

Time: 3 Hrs

Q.P. Code : 588804

Marks: 80

N.B. :
1. Question No. ONE is compulsory
2. Solve any THREE out of remaining questions
3. Assume suitable data if required

Q1. Solve any **Four** of the following

A. Draw layout for 2 input CMOS NAND gate. 20 Marks

B. How to distribute a clock properly in VLSI chip?

C. Draw layout for minimum size 6T SRAM cell.

D. Explain the issues associated with pass transistor logic with suitable example.

E. Explain constant voltage scaling?

Q2. A. Explain the fabrication process flow for NMOS with proper device cross section and layout. 10 Marks

B. Explain pseudo NMOS logic with suitable example. 05 Marks

C. Show realization of MOSFET based one Bit Shift Register. 05 Marks

Q3. A. Design the circuit and draw layout for the function $Y = \overline{(D + E + A)(B + C)}$ using CMOS logic. Also find equivalent CMOS inverter circuit for simultaneous switching of all inputs assuming that $(W/L)_P=30$ for all PMOS transistors and $(W/L)_n=10$ for all NMOS transistors. 10 Marks

B. What are the problems of Domino logic? Also suggest remedy for these problems. 10 Marks

Q4. A. With neat diagrams explain the principle of working of NOR flash. 10 Marks

B. Draw and explain Barrel shifter. 06 Marks

C. Draw schematic and layout for 4:2 decoder. 04 Marks

Q5. A. Explain ripple carry adder in detail. 10 Marks

B. Explain how to ensure faithful write operation in case of 6T SRAM Cell. 06 Marks

C. Compare LEVEL 1 and LEVEL 2 MOSFET model. 04 Marks

Q6. A. With suitable diagrams explain on chip clock generation circuit. 05 Marks

B. Explain a typical power distribution scheme followed in VLSI chip. 05 Marks

C. Describe the dynamic power dissipation in CMOS. 05 Marks

D. Explain Latch-up in CMOS. 05 Marks

TE SEM - VI (3 98)

(2)
(10)

Dec - 2016

TE (VI-Sem) EXTC – OS.

CBGS

(3 Hours) QP Code : 588700

[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) What is an operating system? Explain the different functions of OS. 5
(b) What is a file directory? Describe methods of organizing directories in an OS. 5
(c) What are the characteristics of a Real Time OS? 5
(d) What is system call? Explain any five system calls. 5

2. (a) Define the meaning of a race condition, use an execution sequence to illustrate your answer. 10
(b) Explain clearly how UNIX performs file management using I-nodes. 10

3. (a) Suppose that a disk drive has 5000 cylinders, numbered 0 to 4999. The drive is currently serving a request at cylinder 143, and the previous request was at cylinder 125. The queue of pending requests, in FIFO order is 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130 starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all a pending requests, for each of the following disk scheduling algorithms? 10
(i) FCFS (ii) SSTF (iii) SCAN (iv) LOOK
(b) Explain the different allocation method for file. 10

4. (a) Consider the following process 10

Process	Arrival Time	Service Time
P1	0	8
P2	1	4
P3	2	9
P4	3	5

Solve the above given problem with shortest remaining time first by drawing gantt chart and also calculate the average waiting time, turn around 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) Describe process management in Linux. 10

6. (a) What is deadlock? Explain deadlock prevention and avoidance. 10
(b) What is Semaphore? Give an implementation of bounded buffer producer consumer problem using semaphore. 10

(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 systems? 10
(b) Describe the working of digital TV system. 10

4. (a) Draw and explain orthicon camera tube. What do you understand by dark current in vidicon? 10
(b) Draw composite video signals for three 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 FBT. 10

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EXTC - CBSGS - Sem VI Nov-Dec 2016

Sub:- TE 12.12.16

Q.P. Code : 588602

(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) An odd number of lines are chosen in television system for scanning. Justify 5
b) What is compatibility in TV transmission? What are the requirements to be met to make the colour system fully compatible? 5
c) Compare Plasma, LED and LCD displays. 5
d) Explain in brief Direct-to-home TV (DTH). 5

2 a) Explain with the help of suitable sketch, how is video signal developed in a vidicon camera tube? How is different from other camera tubes and what are its special applications? 10
b) Draw the block diagram of PAL TV receiver and explain the working and functions of each block. 10

3 a) What is the difference between component video and composite video? Give the main features of CCIR Rec.601 for digital video standards 10
b) Describe new TV standards and compatibility adopted for HDTV. Explain MUSE system and its advantages. 10

4 a) Sketch composite video signal waveform for at least three successive line and indicate: 5
i. Extreme white level
ii. Blanking level
iii. Pedestal height
iv. Sync pulse level

b) Only (R-Y) and (B-Y) colour difference signals along with luminance signal is chosen for transmission. Justify the statement. Also explain why it is necessary to weight down the chrominance signal. 10
c) What are the technical advantages of using digital technology in television systems? 5

TURN OVER

5. a) What is the need of MAC encoding? Explain the general format of MAC signals for transmitting colour TV signals.

b) Explain the following terms of Digital video.

i. Digitization

ii. Viewing distance and angle

iii. Aspect ratio

6. a) Explain Interlace Scanning? Calculate the percentage of interlace error when the second field is delayed by 16 microseconds. Retrace time may be assumed to be negligible.

b) Write a note on Wide Dimension High Definition Television and its standards.

Dec 16, Sem VI (old) ExTC DC

07/12/2016

Sub - Digital Communication

QP CODE : 587002

(3 Hours)

[Total Marks : 100

N.B:
1 Question No.1 is compulsory.
2 Answer any four out of remaining six questions.
3 Assumptions made should be clearly stated.
4 Assume any suitable data whenever required but justify the same.

1. (a) For the bit sequence 10011101 draw the following line codes 8
i) Polar RZ
ii) AMI-RZ
iii) Manchester
iv) Dicode NRZ

(b) Compare 8
i) 16-PSK and 16 – QAM
ii) Block codes and Convolutional codes

(c) Explain correlator operation 4

2. (a) Draw the block diagram of OQPSK transmitter. A bit stream b(t) = 0910110110 is to be transmitted. sketch waveform at the o/p of each block. 8

(b) Explain the transmitter and receiver of DEPSK system with block diagram. Why error occurs in pairs in DEPSK system ? Give suitable example. 8

(c) Write properties of matched filter 4

3. (a) Derive relation to find probability of error for an optimum filter. Hence derive the transfer function for an optimum filter. 8

(b) Explain MSK with the help of relevant expressions and waveforms. Sketch the PSD of MSK and QPSK and compare them. 8

(c) Draw waveform of DPSK system. 4

4. (a) For a source emitting 4 symbols with probabilities 0.5,0.25,0.125,0.125 Calculate entropy and also apply Huffman algorithm to find the codes assigned. 6

(b) Consider (3,2,1) convolution code with $g^{(1)}$=(101) $g^{(2)}$=(110) $g^{(3)}$=(011). Draw the trellis diagram with min. 4 stages. Use this diagram to encode 10001. 8

(c) The generator polynomial of n (7,4) code is given as $G(x)= x^3+x^2+1$. Find the code vector for the message 1101 in systematic and non-systematic form. Also draw the encoder. 6

5. (a) The binary data 0101001101 is applied to the input of a modified duobinary encoder 10
i) Construct the modified duobinary coder output and corresponding receiver output without precoding.
ii) Suppose that due to error during transmission, the produced by the third digit is changed. Construct the receiver output. What should be done to avoid error propagation..

(b) i) Explain Nyquist Pulse Shaping theorem. 6
ii) Compare BASK and BFSK 4

6. (a) Derive the PSD for Unipolar NRZ 5

(b) i) Derive the expression for probability of error for QPSK. 5

ii) Consider the following (K+1, K) systematic linear block code with the parity check digit C_{k+1} given as 7
C_{k+1} = d1+d2+.....+ dk
(i) Construct appropriate generator matrix for this code.
(ii) Construct the code generated by this matrix for k=3
(iii) Determine the error correcting and detecting capability

[TURN OVER

7. (a) Write short note on: (Any four)
   i) Intersymbol Interference
   ii) Viterbi Decoding
   iii) Equalization
   iv) RS Codes
   v) Eye pattern

Dec 16 Sem VI CBSGS & EXTC CCTN

07/12/2016

Sem - VII (CBGS) EXTC NOV-DEC-2016

Sub - CCTN

Q.P. Code : 588501

(3 Hours) [Total Marks : 80

N.B. : (1) Question **No.1** is **compulsory.**
(2) Solve **any Three** out of remaining questions.
(3) Assume suitable **data** wherever **required.**
(4) **Answers** to the questions should be **grouped** and written together.

1. (a) List and describe in brief network connection topologies. 5
(b) Differentiate the host to host delivery provided by data link layer and network layer. 5
(c) What is socket address? Explain with example. 5
(d) Compare between circuit switching and packet switching. 5

2. (a) Explain DNS protocol with query resolution. 10
(b) Classify unicast routing protocol. Explain exterior routing protocol in brief. 10

3. (a) Compare between Ethernet LAN and IEEE 802.11 WLAN. 5
(b) What are DSL and HFC? Describe in brief. 5
(c) What is peer-to-peer communication? Describe decentralized peer-to-peer sharing. 10

4. (a) Draw a neat diagram of TCP Header. 5
(b) Explain CSMA/CD technique with exponential back-off algorithm. 5
(c) Describe in details the physical transmission media for computer communication networks. 10

5. (a) Compare between Distance Vector algorithm and Link state routing algorithm. 10
(b) Draw a neat diagram of IPv4 Header. Explain each field. 10

6. Write short notes on (**any Two**) : 20
(a) Networking Devices
(b) ATM
(c) IPv6

DTSP/EXTC/VI/CBGS/ 29/11/2016

SEM - VI EXTC Revised NOV-DEC-2011

Sub - DTSP

O.P. Code : 582402

(3 Hours) Total Marks : 80

N. B. : (1) Q.1 is compulsory.

(2) Solve any three questions from remaining 6 questions

(3) Assume suitable data if it is required.

Q.1 (a) Explain phase delay and group delay [20]

(b) What are the advantages of digital filter over analog filter?

(c) State and prove frequency shifting property of DFT

(d) Compare: FIR filter and IIR filter.

Q.2 (a)(i) x(n)={ 1 , 2, 3 ,4} find DFT X(k)

(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 described by the following differential equation [10]

$y(n) = 0.9y(n-1) + bx(n)$

(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.

Q3 (a) If x(n)={ 1 0 2 0 3 0 4 0}, Find X(K) using DIFFFT. Compare computational complexity of [10]

above algorithm with DFT.

(b)Explain effect of aliasing in Impulse Invariant Technique

Using this method, determine H(Z) for $H(s) = \frac{3}{(s+2)(s+3)}$ if T =0.1 sec [10]

Q.4 (a) Design a Linear Phase FIR Low Pass filter of Length 7 and cut off frequency 1 rad/sec using [10]

Hamming window.

(b) If x(n) = {1 2 3 ,2} and h(n) = { 5,6 7 8} [10]

a) Find circular convolution using time domain method.

Find circular convolution using DFT / IDFT method.

Find linear convolution using circular convolution.

[TURN O

Q.5(a) Design a digital Butterworth filter for following specifications using Bilinear Transformation Technique

Attenuation in Pass band = 1.93 dB, Pass band Edge frequency = 0.2π
Attenuation in Stop band = 13.97dB Stop band Edge frequency = 0.6π [10]

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

Q.6(a) Determine FIR lattice coefficient of system with transfer function [10]

$$H(Z) = 1+\frac{13}{24}Z^{-1}+\frac{5}{8}Z^{-2}+\frac{1}{3}Z^{-3}$$

(b) Write a note on Frequency Sampling realization of FIR Filter [10]

VI | EXTC(old) | AWP |

T.E. SEM-VI EXTC (Old) NOV-DEC-2016 Q.P. Code : 586903

Sub - AWP

29/11/2016

(2) (10)

(3 Hours) (Total Marks 100)

N.B: (1) Question No.1 is compulsory.
(2) Solve any four questions from the remaining.
(3) Assume suitable data wherever necessary and justify the assumption.
(4) Draw suitable diagrams wherever required.

1. Answer the following
a) Maxwell's equation's for harmonic variations
b) Ground interference effects
c) Explain different types of antenna losses
d) FRIIS transmission formula 20

2. a) Derive the expression for radiation resistance of an infinitesimal dipole, explain its significance. 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) What is folded dipole antenna? Explain its operation, equation, properties and applications. 10

4. a) Explain with suitable diagram the working of Log Periodic Antenna. Write its practical applications. 10
b) Explain working of parabolic reflector antenna and its different feed mechanisms. 10

5. a) Draw and explain Yagi antenna. Sketch its radiation pattern. Write the applications of Yagi Antenna. 10
b) Explain the different components of the ground waves. What are frequency characteristics of ground waves? 10

TURN OVER

6. a) Explain the principal modes of operation of helical antennas and draw its radiation pattern.
   b) Explain the mechanism of isotropic propagation. Define critical frequency, MUF and OWF.

7. Write notes on
   a) Retarded potential and its applications
   b) Sleeve dipole
   c) The equivalent noise temperature of an antenna
   d) Dielectric waveguide.

(Old Courses)

(3 Hours)

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

(b) Explain function of EU in 8086

(c) Explain Flag register of 8086

(d) Explain significance of [illegible] in 8086

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

(i) DAW (ii) BTG PORT C,4,0 (iii) ANDLW

(b) Draw and explain interfacing of 8086 with ICNS

3 (a) With the help of flowchart/algorithm write assembly language program in 8086 to

to arrange a data block of ten 8 bit numbers in ascending order. Assume

necessary data

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

4 (a) Explain interrupt structure of 8086

(b) Explain addressing modes of PIC 18F microcontroller

5 (a) Explain interfacing of 8255 with 8086 in parallel mode

(b) Design 8086 microprocessor based system using minimum mode with following specifications 10

(i) 8086 microprocessor working at 8 MHz.

(ii) 64 KB EPROM using 32 K x 8 devices.

(iii) 64 KB SRAM using 32 K x 8 devices.

Clearly show memory map with address ranges.

6. (a) Explain string instructions and prefix of 8086. 10

(b) Interface two common anode seven segment display to PIC 18F microcontroller using PORT B and PORT C. Explain interfacing with the help of neat block diagram and suitable diagram. 10

7. Write note on any four of the following 20

(a) PIC 18F Pipeling.

(b) Comparative study of salient features of 8086 and 80486.

(c) Memory banking in 8086.

(d) PIC 18F STATUS register.

(e) Memory segmentation in 8086.

EXTC Sem VI (CBGS) DC 23/11/16

Sub - DC

NOV - DEC - 2016

(10)

QP Code : 588301

(3 Hours)

[Total Marks : 80

N.B: (1) Question **No 1** is **compulsory.**
(2) Attempt any **three** questions out of remaining five.
(3) All questions carry **equal marks.**
(4) Assume Suitable data, if required and state it clearly

1 Attempt any Four :-
(a) Compare systematic and nonsystematic codes 5
(b) How is spread spectrum signal different from normal signal? 5
(c) Derive the expression for entropy? When is entropy maximum? 5
(d) Explain QPSK is better than PSK? 5
(e) Write short note on Optimal filter. 5

2 (a) A discrete memory less source has an alphabet of five symbol with their probabilities as shown in 10

Symbol	m_1	m_2	m_3	m_4	m_5
Probability	0.4	0.19	0.16	0.15	0.10

Construct a shanon Fano code for the source and calculate code efficiency, redundancy of the code. Repeat same for the Huffman source coding technique.

(b) Explain the meaning of equalizer. How is equalization achieved? With the help of neat block diagram explain tapped delay line equalizer. 10

3 (a) State and explain maximum likelihood decision rule. Explain the function of correlator receiver. 10

(b) State and explain the condition for orthogonality of the BFSK signal determine its spectrum and hence bandwidth requirement for transmission of signal. 10

4 (a) Draw the signal space diagram of 16-QASK and calculate the Euclidean and compare with 16-PSK. 10

[TURN OVER

(b) A generator matrix of (6,3) linear block code is given by

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

Determine

1. All the code vectors.
2. "d_{min}" for the above code.
3. Error detection and correction capability.
4. If the received sequence is 101101, determine the message bit sequence.

5. (a) Sketch the encoder and syndrome calculator for the generator polynomial $g(x) = 1 + X^2 + X^3$ and obtain the syndrome for the received codeword 1001011. 10

(b) Generator vectors for a rate 1/3 convolution encoder are : 10
$g_1 = (101)$, $g_2 = (100)$, $g_3 = (111)$.
Draw Encoder diagram, trellis diagram, using trellis find code vector if message vector is (101100).

6. (a) Draw the block diagram for FH-SS system and explain the working. Differentiate between slow frequency hopping and fast frequency hopping. 10

(b) Draw the block diagram of QPSK transmitter and receiver and sketch the waveform. 10