

3/12/13

TE - SEM VI (REW) Dec 2013

D.C. EXTC

56 Con-code 5 - JP

Con. 8523-13.

LJ-11580

(3 Hours)

[Total Marks : 100

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

Q1 Answer the following questions (Any four) [20]

- Compare systematic and nonsystematic codes
- Distinguish between channel and line coding.
- Explain Shannon Hartley theorem
- Derive the condition for maximum entropy of a source. How does entropy vary with Probability?

Q2a. Explain the working of QPSK system with neat block diagram. [10]

Q2b. Draw the signal space representation of QAM system. Calculate the Euclidean distance between two symbols. Derive an expression for transmitted signal. [10]

Q3 a. Explain the working of duo-binary encoder with pre-coder. What are the drawbacks of duo-binary encoder? Plot the spectrum of duo binary encoder. [10]

Q3b. A discrete memory less source 'S' produces the symbol A, B and C with probabilities 0.4, 0.25, and 0.35, respectively. (i) Can the output of this source be compressed so that the average codeword length is 2 bits? Give reasons for your answer. Device a Huffman code for this source and determine its coding efficiency. (ii) Device a Huffman code for the second order extension of this source and find the average length of the codeword for this code. What is the coding efficiency? [10]

Q4a. What is the necessity of equalizer in a transmission system? Explain any one equalizer. [10]

Q4b. The parity check equations for a (6, 3) systematic code are

$$b_0 = c_3 = m_0 + m_1 + m_2$$

$$b_1 = c_4 = m_0 + m_1$$

$$b_3 = c_5 = m_0 + m_2$$

Determine the generator matrix, parity check matrix; list all the code vectors of the code, what is error correcting capability of the code? Prepare appropriate decoding table. Decode the following received code words 101100, 010011 and 001100. [10]

Q5a. Consider (3, 1, 2) convolution code with $g^1 = (101)$, $g^2 = (110)$, and $g^3 = (011)$. Draw the Trellis diagram with minimum four stages. Using this diagram, find the codeword for the sequence (110001). [10]

Q5 b. Derive the code transfer function and explain Viterbi decoding algorithm [10]

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Q6a. Derive the expression for minimum probability of error for a matched filter. [10]

Q6b. What is band-limiting of signal necessary? What are its disadvantages? List the methods to overcome them. [10]

Q7 write a note on any three. [20]

- a) CRC codes
 - b) ISI and ICI and remedy
 - c) Lempel-Ziv coding
 - d) GMSK with advantages and disadvantages
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Con. 8844-13.

LJ-11620

(3 Hours)

[Total Marks : 100

- N.B. :** (1) Questions No. 1 is **compulsory**.
(2) Answer any **four** out of remaining **six** questions.
(3) Draw neat diagrams wherever **necessary**.

1. Answer the following:— 20
- (a) What do you understand by positive and negative modulation? Justify the choice of modulation for TV transmission.
 - (b) What are the video amplifier section requirements in order to preserve the video signal contents.
 - (c) Why is vestigial sideband transmission used for transmission of TV picture signals? What is the need for vestigial sideband correction?
 - (d) What are the various streaming media protocols?
2. (a) Show that a total channel bandwidth of 7 MHz is necessary for successful transmission of both picture and sound signals in the 625 line TV system. Sketch frequency distribution of the channel and mark the locations of picture and sound signal carrier frequencies. Why is the sound carrier located 5.5 MHz away from the picture carrier? 10
- (b) Explain the following terms w.r.t. colour transmission: 10
- i) Luminance, Hue, Saturation
 - ii) Additive and Subtractive Mixing
3. (a) In an image orthicon:— 10
- i) Why is the electron Beam given a cycloidal motion before it hits the target plate?
 - ii) Why is the electron beam velocity brought close to zero on reaching the target plate ?
 - iii) What is the function of the decelerator grid?
4. (a) List the important equipments needed for troubleshooting a TV receiver. Suggest the common procedure to be followed while troubleshooting a TV receiver. 10
- (b) i) What are the essential requirements to be satisfied to make a colour TV system fully compatible with monochrome system? 5
- ii) Draw a neat block diagram of a sync separator and explain its operation. 5

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Con. 8844-LJ-11620-13.

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5. (a) Explain at least four test signals used for testing / aligning a TV receiver. **10**
- (b) Describe the working of a Digital TV System. **10**
6. (a) Draw the block diagram of NTSC encoder and decoder. Explain the function of each block. **10**
- (b) What do you mean by interlace error? How does it affect the quality of picture? Calculate the percentage interlace error when the second field is delayed by $16\mu\text{s}$. Retrace time may be assumed to be negligible. **10**
7. (a) Describe the working of a CCTV system. **6**
- (b) What are the advantages of geostationary satellites? Explain the terms 'uplink' , 'downlink' as used in satellite system. **6**
- (c) What is the function of a degaussing coil in a TV receiver? **4**
- (d) What are the advantages of interlaced scanning? **4**

07-11-2013-DTP-P-7-MU-20

Con. 7339-13.

LJ - 11488

(3 Hours)

[Total Marks : 100

- N. B. : (1) Question No. 1 is **Compulsory**.
(2) Solve any **four** questions from **remaining** questions.

1. (a) Design memory system for 8086 microprocessor with following specifications. **12**
 - (i) 8086 microprocessor working in minimum mode at 10 MHz frequency.
 - (ii) 32 KB EPROM using 8 KB chips.
 - (iii) 16 KB SRAM using 4 KB chips.Explain the design and show memory address map.
- (b) Draw and explain typical I/O port pin structure of PIC 18. **4**
- (c) Describe Mode Set Register of DMA controller 8257. **4**
2. (a) Explain control word and status word of 8087 NDP. **10**
- (b) Describe addressing modes of PIC 18. **10**
3. (a) Interface Seven segment display with PIC 18 and explain its working. **8**
- (b) Draw and explain timing diagrams for read operation in minimum and maximum mode of 8086 microprocessor. **12**
4. (a) Explain memory organisation of PIC 18. **10**
- (b) With neat diagram explain interfacing of DMA controller 8257 with 8086 microprocessor in minimum mode. **10**
5. (a) Write an assembly language program for 8086 microprocessor to check whether a string of 10 characters represents Palindrome. **10**
- (b) Interface 8087 NDP with 8086 microprocessor and explain their interaction. **10**
6. (a) Which are the different methods of program looping? Explain each method in short. **10**
- (b) Describe how interface chip and I/O devices are synchronised. Explain it using pulse mode. **10**
7. Write notes on (any **four**):- **20**
 - (a) Status register of PIC 18
 - (b) Control flags of 8086
 - (c) Assembler directives
 - (d) Programming model of 8086
 - (e) Advantages of memory segmentation.

(3 Hours)

[Total Marks : 100]

N.B. : (1) Question No. 1 is **compulsory**. Answer any **four** questions from the remaining **six** questions.

(2) Assume **suitable data** if required.

(3) **Figures** to the **right** indicate **full marks**.

1. Solve any **four** out of **five** questions:- **20**
 - (a) What is antenna, draw and explain all parts of radiation patterns of antenna ?
 - (b) Describe the concept of near-field and far-field radiation.
 - (c) Explain effective aperture of antenna.
 - (d) What is polarization, how circularly polarized wave can be produced ?
 - (e) Derive Friis transmission equation.

2. (a) Derive expression for radiation power density, directivity and effective aperture of infinitesimal dipole antenna. **10**
 - (b) Draw and explain folded dipole antenna and $\lambda/2$ length with appropriate expressions. **10**

3. (a) Derive array factor of N-element linear array, where all elements are equally fed and spaced. **10**
 - (b) An array of $n=8$ in phase isotropic sources spaced $\lambda/2$ apart, is to have a side-lobe level 26dB below the main lobe maximum. Find the amplitude distribution fulfilling this requirement that produce the minimum beamwidth between first nulls. **10**

4. (a) With suitable diagram explain log-periodic antenna and derive its essential parameters. **10**
 - (b) Draw and explain microstrip antenna, also derive its design parameters. **10**

5. (a) Describe normal mode helical antenna and derive axial ratio. What is the effect of the value of diameter D and spacing between each turns S of the same antenna. **10**
 - (b) Describe basic geometry of single reflector antenna, also explain how radiation pattern of the same antenna can be modified. **10**

6. (a) Draw and explain experimental set up of polarization measurement with appropriate patterns. **10**
 - (b) Explain the mechanism of ionospheric propagation. Define critical frequency. **10**

7. Write short note on (any **four**):- **20**
 - (a) Ground wave propagation
 - (b) Directivity of antenna
 - (c) Radiation intensity
 - (d) Rectangular horn antenna
 - (e) Sleeve dipole.