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10AL51

Fifth Semester B.E. Degree Examination, June / July 2014
Management and Entrepreneurship

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. What are the characteristics of management? Explain. **(10 Marks)**
b. Distinguish between management and administration. **(05 Marks)**
c. List the contribution of F.B. Gilberth. **(05 Marks)**

2 a. What are the characteristics of planning? Briefly explain each component. **(10 Marks)**
b. What are the advantages of objectives? **(05 Marks)**
c. What are the important characteristics of decision making? **(05 Marks)**

3 a. What are the principles of organization? Explain each in brief. **(10 Marks)**
b. What are the sources of recruitment? **(05 Marks)**
c. What are the main features of staffing? **(05 Marks)**

4 a. Define leadership. What are the basic styles of leadership? Explain each in brief. **(10 Marks)**
b. What are the features of motivation? **(05 Marks)**
c. Explain McGregor's theory X and theory Y. **(05 Marks)**

PART – B

5 a. What are the major characteristics of an entrepreneur? Explain each in brief. **(07 Marks)**
b. How does an entrepreneur differ from a manager? Explain. **(06 Marks)**
c. In the Indian context, explain the specific role that an entrepreneur has fulfilled in the economic development of the country. **(07 Marks)**

6 a. What are the salient features of new small enterprise policy 1991? **(07 Marks)**
b. What are the characteristics of SSI? **(06 Marks)**
c. What are the major effects of WTO/GATT on Indian SSI? **(07 Marks)**

7 a. Explain DIC single window agency. **(07 Marks)**
b. What are the objectives and functions of SIDBI? **(06 Marks)**
c. What are the functions of KSFC and TECSOK? **(07 Marks)**

8 a. Explain the various guidelines provided by the planning commission for preparation of project report. **(07 Marks)**
b. What are the major errors generally made by entrepreneurs during formulating project report? **(06 Marks)**
c. What are the differences between PERT and CPM? **(07 Marks)**

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10EC52

Fifth Semester B.E. Degree Examination, June/July 2014
Digital Signal Processing

Time: 3 hrs. Max. Marks:100

Note: ***1. Answer FIVE full questions, selecting at least TWO questions from each part.***
2. Use of normalized Chebyshev and Butterworth tables are not allowed.

PART – A

1 a. Prove that the sampling of DTFT of a sequence x(n) result in N-point DFT. **(07 Marks)**

b. If $w(n) = \frac{1}{2} + \frac{1}{2}\cos\left[\frac{2\pi}{N}\left(n - \frac{N}{2}\right)\right]$, what is the DFT of the window sequence $y(n) = x(n).w(n)$? Keep the answer in terms of X(k). **(07 Marks)**

c. Compute the inverse DFT of the sequence $X(k) = \{2, 1+j, 0, 1-j\}$ (↑ at 2) **(06 Marks)**

2 a. Consider the following 8-point sequences defined for $0 \le n \le 7$.
(i) $x_1(n) = \{1, 1, 1, 0, 0, 0, 1, 1\}$ (ii) $x_2(n) = \{1, 1, 0, 0, 0, 0, -1, -1\}$
Which sequences have a real 8-point DFT? Which sequences have an imaginary valued 8-point DFT? **(05 Marks)**

b. Two 8-point sequences $x_1(n)$ and $x_2(n)$ are as shown in Fig.Q2(b). Determine the relation between their DFTs $X_1(k)$ and $X_2(k)$ **(05 Marks)**

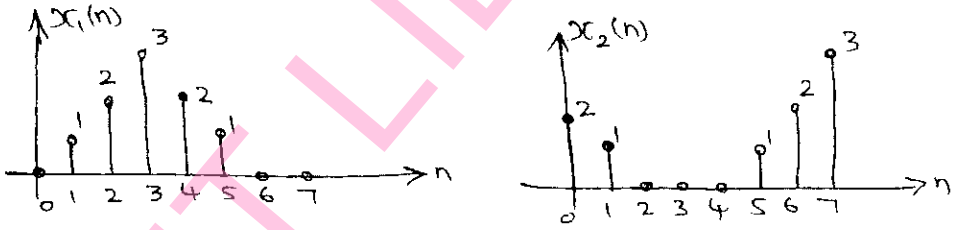

Fig.Q2(b)

c. Given the two sequences $x(n) = \alpha^n$ and $h(n) = \beta^n$ of length = 4, determine
$y(n) = x(n) \circledast_4 h(n)$ **(05 Marks)**

d. For DFT pair shown, compute the values of the boxed quantities using appropriate properties.
$\{\boxed{x(0)}, 1, 2, 2, 3, 3\} \xleftrightarrow{DFT} \{12, \boxed{X(1)}, -1.5 + j0.866, 0, \boxed{X(4)} -1.5 - j2.598\}$ **(05 Marks)**

3 a. What is sectional convolution? Explain any one of them. **(08 Marks)**

b. An FIR filter has the unit impulse response $h(n) = \{1, 2\}$. Determine the output sequence in response to the input sequence.
$x(n) = \{1, -1, 2, 1, 2, -1, 1, 3\}$
using over lap-add technique. Use 5-point circular convolution. **(07 Marks)**

c. Calculate the percentage saving in calculations in a 512-point radix-2 FFT, when compared to direct DFT. **(05 Marks)**

4 a. Determine 8-point DFT of a continuous time signal $x(t) = \sin(2\pi ft)$ with f = 50 Hz. Use DIFFFT algorithm. **(08 Marks)**

b. What is Geortzel algorithm? Obtain DF-II realization of two pole resonator for computing the DFT. **(08 Marks)**

c. What are the differences and similarities between DIF-FFT and DIT-FFT algorithm? **(04 Marks)**

PART – B

5 a. Determine the system function $H_a(s)$ that exhibits Chebyshev characteristics for the following filter specifications:
(i) Ripple of 0.5 dB in band $|\Omega| \le 1$
(ii) At $\Omega = 3$ rad/s, amplitude is down by 30 dB. **(12 Marks)**

b. Derive the expression of order and cutoff frequency of a Butterworth low pass filter. **(08 Marks)**

6 a. Obtain DF-I and DF-II structure of the filter is given by
$y(n) = 2b \cos \omega_o\, y(n-1) - b^2 y(n-2) + x(n) - b \cos \omega_o\, x(n-1)$ **(07 Marks)**

b. Obtain the cascade and parallel realization of the system

$$H(z) \frac{1 + \frac{1}{3}z^{-1}}{\left(1 - \frac{1}{5}z^{-1}\right)\left(1 - \frac{3}{4}z^{-1} + \frac{1}{8}z^{-2}\right)}$$ **(08 Marks)**

c. What are features of FIR lattice structures? **(05 Marks)**

7 a. Compare the rectangular window and hamming window. **(04 Marks)**

b. A low pass filter has the desired response as given by

$$H_d(e^{jw}) = \begin{cases} e^{-j3w}, & 0 \le w \le \frac{\pi}{2} \\ 0, & \frac{\pi}{2} \le w \le \pi \end{cases}$$

Determine the filter coefficients h(n) for M = 7 using frequency sampling technique. **(08 Marks)**

c. The desired response of a low pass filter is

$$H_d(e^{jw}) = \begin{cases} e^{-j3w}, & -\frac{3\pi}{4} \le w \le \frac{3\pi}{4} \\ 0, & \frac{3\pi}{4} < |w| \le \pi \end{cases}$$

Determine $H(e^{jw})$ for M = 7 using a Hamming window. **(08 Marks)**

8 a. Design an IIR digital filter that when used in the prefilter A/D – H(z) – D/A structure will satisfy the following analog specifications:
(i) LPF with –1dB cutoff at 100π rad/sec
(ii) Stop band attenuation of 35 dB or greater at 1000π rad/sec
(iii) Monotonic in SB and PB
(iv) Sampling rate 2000 sample/sec
Use Bilinear transformation technique. **(14 Marks)**

b. An analog filter has the following system function. Convert this filter into a digital filter using backward difference for the derivative

$$H(s) = \frac{1}{(s+0.1)^2 + 9}$$ **(06 Marks)**

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10EC53

Fifth Semester B.E. Degree Examination, June/July 2014
Analog Communication

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. Define auto correlation function of the random process x(t). Explain the properties of auto correlation function. **(08 Marks)**

b. Define the power spectral density and explain its properties. **(07 Marks)**

c. The pdf of a random variable is given as

$$f_x(x) = \begin{cases} K & a \le x \le b \\ 0 & \text{Otherwise} \end{cases}.$$

Where K is constant,

i) Sketch the pdf and determine value of K.

ii) If a = -1 and b = 2, calculate $P(|x| \le C)$ for $C = 1/2$. **(05 Marks)**

2 a. Explain the generation of AM wave using square law modulator with relevant equations and spectrum. **(08 Marks)**

b. Explain the working of costas receiver for demodulating DSB-SC wave. **(06 Marks)**

c. An audio frequency signal 10 sin 2π 500t is used to amplitude modulate a carrier of 75sin $2\pi \times 10^6$t. Assume modulation index as 0.5. Find:

i) Side band frequencies.

ii) Amplitude of each side band.

iii) Band width required.

iv) Total power delivered to a load of 100Ω. **(06 Marks)**

3 a. Derive the expression for representing SSB wave containing LSB in time domain. **(08 Marks)**

b. Define Hilbert transform. Obtain Hilbert transform of the following:

i) $x(t) = A_c \cos 2\pi f_c t$

ii) $x(t) = A_c \sin 2\pi f_c t$. **(06 Marks)**

c. Explain phase discrimination method for generating SSB wave. **(06 Marks)**

4 a. Derive time domain equation for VSB modulated wave containing a vestigial of the lower side band. **(07 Marks)**

b. With a neat block diagram, explain the operation of AM super heterodyne receiver. **(06 Marks)**

c. What is FDM? Explain the detailed scheme of FDM. **(07 Marks)**

PART – B

5 a. With neat circuit diagram, explain direct method of generating FM wave. Also explain feed back scheme for frequency stabilization of a frequency modulator in direct method. **(12 Marks)**

b. An angle modulated signal is represented by $s(t) = 10\cos[2\pi \times 10^6 t + 5 \sin 2000\pi t + 10 \sin 3000\pi t]$ volts. Find the following:

i) The power in the modulated signal.
ii) The frequency derivation.
iii) The derivation ratio.
iv) The phase derivation.
v) The approximate transmission band width. **(08 Marks)**

6 a. With neat circuit diagram, explain FM domodulation using balanced slope detector. **(08 Marks)**

b. Starting from block diagram of pLL obtain its non linear and linear model. Show that output of pLL is scaled version of modulating signal. **(12 Marks)**

7 a. Derive the expression for RMS noise voltage at the output of passive RC lowpass filter. **(07 Marks)**

b. Define white noise. Give the plot of PSD and auto correlation function of white noise. **(07 Marks)**

c. In a communication receiver, the first stage is a tuned amplifier with an available power gain of 20dB and noise figure of 10dB. The output of the amplifier is given to mixer stage, whose noise figure is 20dB. Determine the overall noise figure of the system. **(06 Marks)**

8 a. Derive expression for the figure of merit for DSBSC receiver. **(10 Marks)**

b. Explain function of pre-emphasis and de-emphasis in FM systems. **(10 Marks)**

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10EC55

Fifth Semester B.E. Degree Examination, June/July 2014
Information Theory and Coding

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. A pair of dice are tossed simultaneously in an experiment outcome first dice is recorded as x_1 and 2nd dice as x_2. If the two events are:
$A\{x_1, x_2)$ such that $x_1 + x_2 \leq 8\}$: $B\{x_1, x_2)$ such that $x_1 > x_2\}$.
Then determine: i) Self information of A and B; ii) Entropy of the experiment. **(06 Marks)**

b. Consider the state diagram of a Markov source:

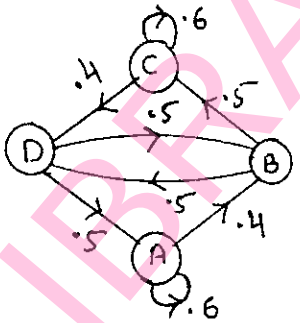

Fig.Q.1(b)

Determine: i) State probabilities; ii) Entropy of each state; iii) Entropy of source. **(08 Marks)**

c. Discuss: i) Additive property of entropy; ii) Symmetrical property of entropy. **(06 Marks)**

2 a. Find the minimum number of symbols, 'r' in the coding alphabet for devising an instantaneous code such that W = {0, 5, 5, 1, 5} device such a code. Where 'W' represent set of code word of length: 1, 2,....n. **(06 Marks)**

b. Construct a binary code for a source with five symbols S = $\{s_1, s_2, s_3, s_4, s_5\}$ with respective probabilities P = {·3, ·2, ·2, ·15, ·15}. Determine code efficiency using Shannon's coding. **(08 Marks)**

c. For the given channel matrix, calculate, H(x), H(y) and channel capacity given $P(x_1) = ·6$, $P(x_2) = ·3$ and $P(x_3) = ·1$

$$P(y/x) = \begin{bmatrix} 1/2 & 1/2 & 0 \\ 1/2 & 0 & 1/2 \\ 0 & 1/2 & 1/2 \end{bmatrix}.$$ **(06 Marks)**

3 a. Design a quarternary and binary source code for the source shown using Huffman's coding procedure S = {s1, s2, s3, s4, s5, s6, s7}; P = {·18, ·17, ·16, ·15, ·10, ·08, ·05} also determine code efficiency. **(10 Marks)**

b. Determine channel capacity of a binary erasure channel. **(10 Marks)**

4 a. Consider a random variable 'x' wholes PDF is shown in Fig.Q.4(a).

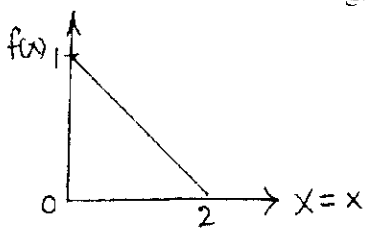

Fig.Q.4(a)

i) Determine the entropy of the source producing this variable.
ii) If the signal is passed through a linear amplifier of gain '8', determine entropy of o/p. **(08 Marks)**

b. Explain Shannon-Hartley law on channel capacity without proof. **(04 Marks)**

c. A CRT terminal is used to enter alphanumeric data in a system. CRT is connected through a telephone with B.W = 3kHz and $[S/N]_0$ = 10dB. Assuming the terminal has 100 characters and data is sent in an independent manner with equal probability:
i) Find average information per character.
ii) Capacity of channel.
iii) Data rate. **(08 Marks)**

PART – B

5 a. Define the terms: i) Burst error: ii) Systematic linear block code: iii) Galois field: iv) Hamming weight. **(04 Marks)**

b. For a systematic (6, 3) linear block code, the parity matrix is $[P] = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 1 \\ 1 & 1 & 0 \end{bmatrix}$. Find all possible code vectors and parity check matrix. **(06 Marks)**

c. Construct the standard array for example in Fig.Q.5(c). Hence determine corrected vector if received vector, z = '000011'. **(10 Marks)**

6 a. For a (7, 4) cyclic code the received vector Z(x) = 0100101 and the generator polynomial is $g(x) = 1 + x + x^3$. Draw the syndrome calculation circuit and correct the single error in the received vector also explain operation of circuit. **(10 Marks)**

b. For a (7, 3) expurgated Hamming code write the code vector table and draw the encoder circuit if $g(x) = 1 + x^2 + x^3$. **(10 Marks)**

7 Write short note on:
a. Burst-error correcting codes.
b. BCH code.
c. Golay code.
d. Shortened cyclic codes. **(20 Marks)**

8 For a (2, 1, 3) convolutional encoder with $g^{(1)} = [1101]$, $g^{(2)} = [1011]$.
a. Draw the convolutional encoder block diagram.
b. Write down the stat transition table.
c. Draw the code tree.
d. Find the encoder o/p produced by msg sequence "11101" by traversing through the code tree. **(20 Marks)**

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10EC56

Fifth Semester B.E. Degree Examination, June/July 2014
Fundamentals of CMOS VLSI

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Write a note on evolution of IC era. **(04 Marks)**

b. Explain the basic DC equations used in different regions of operation of MOS device. Identify these regions on V-I characteristics. **(07 Marks)**

c. Explain with necessary circuit diagram and expressions, the body effect and how it affects the threshold voltage. **(04 Marks)**

d. Find the value of body effect parameter (γ) and the threshold voltage V_{th}, when the applied substrate bias is 3V. Given $V_{tho} = 0.4$ V, $N_A = 10^{16}/cm^3$, thermal equivalent voltage = 26mV, $n_i = 1.5 \times 10^{10}/cm^3$, $t_{ox} = 40$ nm, $\epsilon_0 = 8.85 \times 10^{-14}$ F/cm, $\epsilon_{r(si)} = 11.9$, $\epsilon_{r(ox)} = 3.9$, $q = 1.6 \times 10^{-19}$ C. **(05 Marks)**

2 a. Draw the circuit diagram of a 2 i/p CMOS NAND gate along with stick diagram. Explain also the working of the circuit. **(08 Marks)**

b. Explain how layout optimization can be used for increase in speed with an AND gate circuit and stick diagrams. **(12 Marks)**

3 a. Discuss the working, merits and demerits of the following logic structures with two i/p NAND gate realization as an example:
i) Pseudo NMOS logic ii) Complementary CMOS logic. **(10 Marks)**

b. Explain CMOS domino logic with the basic gate and derive the evaluation voltage equation. What are the advantages of this logic? **(10 Marks)**

4 a. What is sheet resistance? Explain the steps involved in calculating the sheet resistance of: i) transistor channel, ii) nMOS inverter, iii) CMOS inverter. **(09 Marks)**

b. A particular layer of MOS circuit has a resistivity of 10 ohm-cm. A section of this layer is 55 μm long and 5 μm wide and has a thickness of 1 μm. Calculate the resistance from one end of this section to the other end. What is the value of Rs.? **(05 Marks)**

c. What is the drawback of conventional inverter? How it is overcome using super buffers? Explain the working of inverting and non-inverting super buffers with necessary diagrams. **(06 Marks)**

PART – B

5 a. Explain the working of switch logic, pass transistor and transmission gates with their merits and demerits. **(08 Marks)**

b. Explain the structural design concept using bus arbitration logic as an example. **(12 Marks)**

6 a. What are the general considerations to be followed in designing a sub system? **(08 Marks)**

b. What are the basic requirements of a shifter? Explain with an example of 4 × 4 crossbar switch. What are the drawbacks of this basic switch and how it is overcome? **(12 Marks)**

7 a. Explain the working of three transistor dynamics RAM cell with circuit and stick diagrams. **(10 Marks)**

b. Mention and explain various VLSI design tools used. Also explain different levels at simulation of VLSI design. **(10 Marks)**

8 Write short notes on: a. I/O pads b. Real estate in VLSI
c. Silicides d. Clocked circuits. **(20 Marks)**