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10AL51

Fifth Semester B.E. Degree Examination, June/July 2015
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. Define Management. Explain different levels of Management. **(05 Marks)**
b. Explain functional area of Management. **(05 Marks)**
c. What is the profession and administration management? **(10 Marks)**

2 a. Give any four important reasons for the performance of planning functions. **(05 Marks)**
b. Difference between strategic planning and tactical planning. **(05 Marks)**
c. What is decision making? Explain different types of decisions. **(10 Marks)**

3 a. Define an organization and explain principles of organisation. **(05 Marks)**
b. Write a brief note on the following : i) MBO ii) MBE. **(05 Marks)**
c. Discuss any two types of organization structures with highlighting their merits and demerits. **(10 Marks)**

4 a. Briefly explain the purpose of communication. **(05 Marks)**
b. Briefly explain the essentials of a sound control system. **(05 Marks)**
c. Explain Maslow's and Heryburg theories of Human motivation. **(10 Marks)**

PART – B

5 a. Who is an Enterpreneur? Explain the characteristics of an Enterpreneur. **(05 Marks)**
b. Explain the role of an Enterpreneur in economic development of any country. **(05 Marks)**
c. Explain the barrier involved in entrepreneurship. **(10 Marks)**

6 a. What is Small Scale Industry? Briefly explain the need and rationale of SSI's. **(05 Marks)**
b. Explain briefly the Government support for SSI during 5 year plan. **(05 Marks)**
c. Explain the objectives and functions of WTO. **(10 Marks)**

7 a. Write functions of District industries centers / single window concept. **(05 Marks)**
b. Write a short note on NSIC. **(05 Marks)**
c. Explain the objectives and functions provided by TECSOK and KSSIDC. **(10 Marks)**

8 a. Briefly outline the contents of a project. **(05 Marks)**
b. What is Financial and Social feasibility study? **(05 Marks)**
c. What is Project Appraisal? Explain the steps followed in project appraisals. **(10 Marks)**

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10EC52

Fifth Semester B.E. Degree Examination, June/July 2015

Digital Signal Processing

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Compute the DFT of the sequence $x(n) = \cos\left(\frac{n\pi}{4}\right)$ for N = 4, plot |x(k)| and ∠x(k). **(09 Marks)**

b. Find the DFT of the sequence $x(n) = 0.5^n u(n)$ for $0 < n \leq 3$ by evaluating $x(n) = a^n$ for $0 < n < N-1$. **(07 Marks)**

c. Find the relation between DFT and Z transform. **(04 Marks)**

2 a. State and prove the linearity property of DFT and symmetrical property. **(05 Marks)**

b. The five samples of the 8 point DFT x(k) are given as $x(0) = 0.25, x(1) = 1.25 - j0.3018, x(6) = x(4) = 0, x(5) = 0.125 - j0.0518$. Determine the remaining sample if the sequence x(n) is real valued? **(05 Marks)**

c. For $x(n) = \{1, -2, 3-4, 5, -6\}$, without computing its DFT, find the following

i) x (o) ii) $\sum_{k=0}^{5} x(k)$ iii) X(3) iv) $\sum_{k=0}^{5} |x(k)|^2$ v) $\sum_{k=0}^{5} (-1)^k x(k)$ **(10 Marks)**

3 a. Consider a FIR filter with impulse response
h(n) = { 1, 1, 1 }, if the input is
X(n) = { 1, 2, 0, -3, 4, 2, -1, 1, -2, 3, 2, 1 -3). Find the output y(n) using overlap add method. **(12 Marks)**

b. What is in plane computation? What is total number of complex additions and multiplication required for N =256 point, if DFT is computed directly and if FFT is used? **(03 Marks)**

c. For sequence x(n) = { 2, 0, 2, 0 } determine x(2) using Goertzel Filter. Assume the zero initial conditions. **(05 Marks)**

4 a. Find the circular convolution of x(n) = {1, 1, 1, 1 } and h(n) = {1, 0, 1, 0 } using DIF-FFT algorithm. **(12 Marks)**

b. Derive DIT-FFT algorithm for N = 4. Draw the complete signal How graph? **(08 Marks)**

PART – B

5 a. Design a Chebyshev analog filter (low pass) that has a -3dB cutoff frequency of 100 rad/sce and a stopband attenuation 25dB or greater for all radian frequencies past 250 rad/sec **(14 Marks)**

b. Compare Butterworth and Chebyshev filters. **(03 Marks)**

c. Let $H(s) = \frac{1}{s^2 + s + 1}$ represent the transfer function of LPF with a passband of 1 rad/sec. Use frequency transformation (Analog to Analog) to find the transfer function of a band pass fitter with passband 10 rad/sec and a centre frequency of 100 rad/sec. **(03 Marks)**

6 a. Obtain block diagram of the direct form I and direct form II realization for a digital IIR fitter described by the system function.

$$H(z) = \frac{8z^3 - 4z^2 + 11z - 2}{\left(z - \frac{1}{4}\right)\left(z^2 - z + \frac{1}{2}\right)}$$ **(10 Marks)**

b. Find the transfer function and difference equation realization shown in Fig.Q 6(b).

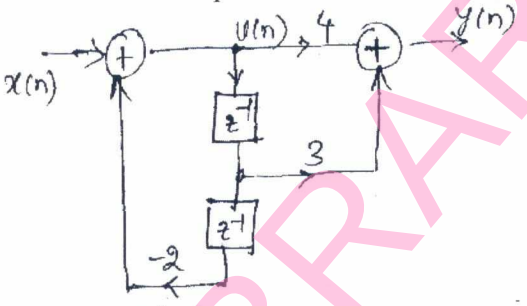

Fig.Q 6(b)

(06 Marks)

c. Obtain the direct form realization of linear phase FIR system given by

$$H(z) = 1 + \frac{2}{3}z^{-1} + \frac{15}{8}z^{-2}$$ **(04 Marks)**

7 a. The desired frequency response of a low pass fitter is given by

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

Determine the frequency response of the FIR if Hamming window is used with N = 7. **(10 Marks)**

b. Compare IIR filter and FIR filters. **(06 Marks)**

c. Consider the pole-zero plot as shown in Fig Q.7(c) i) Does it represent an FIR fitter? ii) Is it linear phase system? **(04 Marks)**

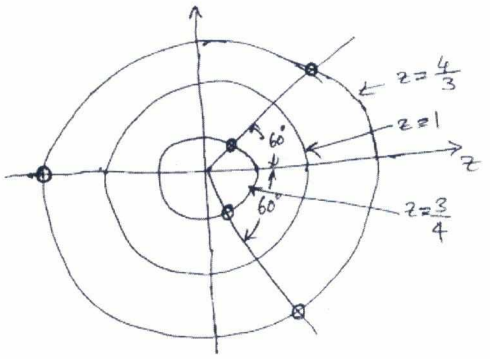

Fig.Q 7(c)

8 a. Design a digital filter H(z) that when used in an A/D-H(z)-D/A structures gives an equivalent analog filter with the following specification :
Passband ripple : ≤ 3.01dB
Passband edge : 500Hz
Stopband attenuation : $\geq$ 15dB
Stopband edge : 750 Hz
Sample Rate : 2 KHz
Use Bilinear transformation to design the filter on an analog system function. Use Butterworth filter prototype. Also obtain the difference equation. **(14 Marks)**

b. Transform the analog filter

$$H_a(s) = \frac{s+1}{s^2+5s+6}$$

Into H(z) using impulse invariant transformation Take T = 0.1 Sec. **(06 Marks)**

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10EC53

Fifth Semester B.E. Degree Examination, June/July 2015
Analog Communication

Time: 3 hrs. Max. Marks:100

Note: *1. Answer any FIVE full questions, selecting atleast TWO questions from each part.*
2. Missing data be suitably assumed.
3. Standard notations are used.
4. Draw neat diagrams, wherever necessary.

PART – A

1 a. Define joint probability density function. Prove that the total volume under the surface represented by the joint PDF is always 1. **(07 Marks)**

b. State and prove central limit theorem. **(07 Marks)**

c. Find the CDF for an experiment of tossing a coin. The random variable maps head (H) with value 1 and tail (T) with value – 1. **(06 Marks)**

2 a. Explain the generation of DSB-SC using ring modulator. **(07 Marks)**

b. Explain with block diagrams, quadrature carrier multiplexing and demultiplexing system. **(07 Marks)**

c. A 500W carrier is modulated on a depth of 70%, calculate the total power in the modulated wave in the following forms of AM.
i) Double sideband with full carrier.
ii) Double sideband suppressed carrier.
iii) Single sideband suppressed carrier. **(06 Marks)**

3 a. Define Hilbert transform. Using Hilbert transform, derive the equation for SSB signals only with USB and rejecting the LSB. Explain with block diagram. **(07 Marks)**

b. With block diagram explain third method for generation of SSB modulated waves. **(07 Marks)**

c. $X(t) = A_c\, m(t) \cos 2\pi f_c t$, obtain its pre-envelope and complex conjugate of pre-envelope. **(06 Marks)**

4 a. Explain the method of envelope detection of a USB wave plus carrier. **(06 Marks)**

b. With the help of block diagram, explain the working of FDM system. **(07 Marks)**

c. Explain with a block diagram working of a superheterodyne receiver. Mention its advantages over TRF receiver. **(07 Marks)**

PART – B

5 a. Derive the equation for FM waves. Define modulation index, maximum deviation and bandwidth of a FM signal. **(07 Marks)**

b. With the help of block diagram, explain the generation of narrowband FM using DSB-SC modulator. **(07 Marks)**

c. A carrier wave of amplitude 5V and frequency 90MHz is frequency modulated by a sinusoidal voltage of amplitude 5V and frequency 15kHz.The frequency deviation constant is 1 kHz/V. Sketch the spectrum of the modulated FM wave. Given $J_0 = 0.96$, $J_1 = 0.18$ and $J_2 = 0.02$. **(06 Marks)**

6 a. Explain the working of a balanced slope detector. **(07 Marks)**

b. With a block diagram, explain the working of a FM stereo multiplexing. **(07 Marks)**

c. Explain the linear model of phase locked loop. **(06 Marks)**

7 a. Derive Friiss's formula for cascade connection of two post network. **(07 Marks)**

b. Define noise factor of a network. Show that by proving suitable equations that with the increase in noise factor the noise power at the output will also increases. **(07 Marks)**

c. If each stage has a gain of 10dB and noise figure of 10dB. Determine the overall noise figure of a two stage cascaded amplifier. **(06 Marks)**

8 a. Derive the equation for the figure of merit of an AM receiver operating on single tone AM. **(07 Marks)**

b. Derive the equation for the signal to noise ratio at the output of the DSB-SC receiver. **(07 Marks)**

c. Explain about pre-emphasis and de-emphasis in FM. **(06 Marks)**

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10EC54

Fifth Semester B.E. Degree Examination, June/July 2015
Microwaves and Radar

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Derive:
   i) Voltage and current equations on a transmission line.
   ii) The characteristic impedance of the line.
   iii) Propagation constant.
   iv) Phase velocity.
   v) The relative phase velocity factor. **(12 Marks)**

b. What is impedance matching? Explain single stub matching and double stub matching. **(08 Marks)**

2 a. Derive $TE_{m,n}$ field equation in rectangular waveguide and define cut off wave number, cutoff frequency, propagation constant, phase velocity, character wave impedance and wave length in the guide. **(10 Marks)**

b. Explain why TEM mode is not possible in waveguides. **(02 Marks)**

c. Explain faraday rotation and discuss microwave circulator. **(08 Marks)**

3 a. Discuss the criterion for classifying the modes of operation for Gunn effect diodes. For a transit time domain mode, the domain velocity is equal to the current drift velocity is 10^7 cm/s. Determine the drift length of the diode of a frequency of 8GHz. **(07 Marks)**

b. Explain how carrier current $I_o(t)$ and external current $I_e(t)$ are generated when a read diode is mounted in a microwave resonant circuit, with the aid of diagrams for structure of read diode, field distribution, applied ac voltage and $I_o(t)$ and $I_e(t)$. **(07 Marks)**

c. Write equivalent circuit for a parametric amplifier. AN up-converter parametric amplifier has the following parameters:
   i) Figure of merit; $\gamma Q = 8$
   ii) Ratio of output frequency over signal frequency $f_o/f_s = \delta$
   iii) Factor of merit figure; $\gamma = 0.2$
   iv) Diode temperature $T_d = 300°$ t
   Calculate: i) The power gain in dB; ii) The noise figure in dB; iii) Bandwidth. **(06 Marks)**

4 a. What is a reciprocal network? For a reciprocal microwave N-port network prove that the admittance and impedance matrices are symmetrical. **(07 Marks)**

b. State and prove the following properties of S-parameters:
   i) Symmetry property for a reciprocal network.
   ii) Unitary property for a lossless junction. **(08 Marks)**

c. The impedance matric of a passive network is given by $Z = \begin{bmatrix} 4 & 3 \\ 1 & 2 \end{bmatrix}$, find scattering matrix. **(05 Marks)**

PART – B

5 a. Why are co-axial connectors and adapters used? List six types of co-axial connectors with their frequency ranges. **(05 Marks)**

b. What are waveguide tees? Explain with the aid of neat diagram, E-plane tree and H-plane tree. **(09 Marks)**

c. List four applications of Magic-T. Explain Magic-Tee as a microwave mixer. **(06 Marks)**

6 a. Show that, for a micro strip line, the quality factor is $Q_c = 0.636\ h\sqrt{\sigma f_{CH_2}}$. **(07 Marks)**

b. A gold parallel strip line has the following parameters:
Relative dielectric constant of polyethylene $\varepsilon_{rd} = 2.25$.
Strip width; W = 25mm.
Separation width; d = 5mm
Calculate:
i) Characteristic impedance of the strip line.
ii) Strip-line capacitance .
iii) Strip-line inductance.
iv) Phase velocity. **(08 Marks)**

c. Write a note on coplanar stripline. **(05 Marks)**

7 a. What is radar? With a neat block diagram, explain the operation of radar. **(08 Marks)**

b. Explain the various forms of radar equation. **(06 Marks)**

c. Discuss the applications the radar. **(06 Marks)**

8 a. With a neat block diagram, explain CW Doppler radar. **(08 Marks)**

b. Explain a simple MTI delay line canceller. **(08 Marks)**

c. Discuss the difference between MTI and Doppler radar. **(04 Marks)**

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10EC55

Fifth Semester B.E. Degree Examination, June/July 2015
Information Theory and Coding

Time: 3 hrs. Max. Marks:100

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

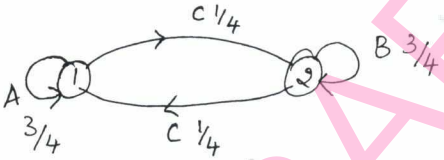
PART – A

1 a. Derive an expression for average information content (entropy) of long independent messages. **(05 Marks)**

b. Define information [I], average information, information rate, symbol rate and mutual information. **(05 Marks)**

c. For the Markov source model shown below compute initial probabilities, state entropy source entropy and show that $G_1 > G_2 > H(s)$. **(10 Marks)**

Fig.Q.1(c)



2 a. Explain Shannon's noiseless encoding algorithm. **(04 Marks)**

b. Using Shannon's binary encoding algorithm, find all the code words for the symbols given below also find its efficiency and redundancy. Given: **(08 Marks)**

S_0	S_1	S_2	S_3	S_4
0.55	0.15	0.15	0.1	0.05

c. State all the properties of entropy and prove the external property. **(08 Marks)**

3 a. For a channel whose matrix is as given below for which $P(x_1) = 1/2$; $P(x_2) = P(x_3) = 1/4$ and r_s = 10,000 sym/sec. Find H(x), A(y), H(x, y), H(x/y), H(y/x), I(x,y). Also find information rate at transmitter (R_{in}) and information rate at receiver (R_t), capacity, efficiency and redundancy.

$$P(y/x) = \begin{bmatrix} 0.8 & 0.2 & 0 \\ 0.1 & 0.8 & 0.1 \\ 0 & 0.2 & 0.8 \end{bmatrix}.$$ **(10 Marks)**

b. A source produces 9 symbols with probabilities {0.36, 0.24, 0.12, 0.08, 0.08, 0.07, 0.03, 0.02}.

i) Construct Huffman binary code and determine its efficiency (η) and redundancy (R).

ii) Construct Huffman ternary code and find its efficiency (η) and redundancy (R). **(10 Marks)**

4 a. State and explain Shannon Hartley law. Derive an expression for the upper limit of the channel capacity. **(07 Marks)**

b. Define mutual information and explain all the properties of mutual information. **(06 Marks)**

c. Two noisy channels are cascaded whose channel matrices are given by

$$P(y/x) = \begin{bmatrix} 1/5 & 1/5 & 3/5 \\ 1/2 & 1/3 & 1/6 \end{bmatrix} \quad P(z/y) = \begin{bmatrix} 0 & 3/5 & 2/5 \\ 1/3 & 2/3 & 0 \\ 1/2 & 0 & 1/2 \end{bmatrix}$$ with $P(x_1) = P(x_2) = 1/2$, find the over all mutual information I(x,z) and I(x,y). **(07 Marks)**

PART – B

5 a. Draw the block diagram of a digital communication system and explain the function of each block. **(06 Marks)**

b. The parity check bits of a (7, 4) Hamming codes are generated by

$c_5 = d_1 + d_3 + d_4$

$c_6 = d_1 + d_2 + d_3$

$c_7 = d_2 + d_3 + d_4$

where d_1, d_2, d_3 and d_4 are message bits

i) Find generator matrix (G) and parity check matrix [H] for this code.

ii) Prove that $GH^T = 0$.

iii) Find the minimum weight of this code.

iv) Find error detecting and correcting capability.

v) Draw encoder circuit and syndrome circuit for the same. **(12 Marks)**

c. Compare fixed length code and variable length code. **(02 Marks)**

6 a. A (15, 5) linear cyclic code has a generator polynomial $g(x) = 1 + x + x^2 + x^4 + x^5 + x^8 + x^{10}$.

i) Draw the cyclic encoder and find codeword for the message polynomial. $D(x) = 1 + x^2 + x^4$ in systematic form by listing the states of the shift register.

ii) Draw the syndrome calculator circuit for given g(x). **(12 Marks)**

b. For the given generator polynomial find generator matrix and parity check matrix and find codeword for (7, 3) Hamming code and its hamming weight $g(x) = 1 + x + x^2 + x^4$. **(08 Marks)**

7 Write short notes on:

a. BCH codes

b. Shortened cyclic code

c. RS code

d. Golay code

e. Burst error correcting code. **(20 Marks)**

8 a. Consider the convolutional encoder shown below:

i) Draw the state diagram

ii) Draw code tree

iii) Find the codeword for the message sequence 10111. **(10 Marks)**

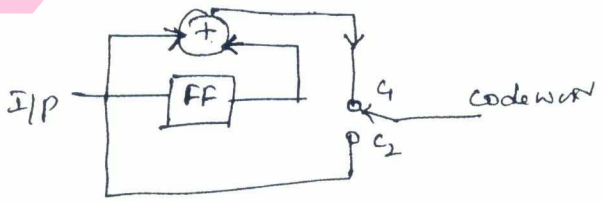


Fig.Q.8(a)

b. For a (2, 1, 2) convolutional encoder with generator sequence $g^{(1)} = 111$ and $g^{(2)} = 101$.

i) Draw convolutional encoder circuit.

ii) Find the codeword for the message sequence 10111 using time domain approach and transfer domain approach. **(10 Marks)**

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10EC56

Fifth Semester B.E. Degree Examination, June/July 2015
Fundamentals of CMOS VLSI

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Discuss the nMOS enhancement mode transistor for different conditions of vds. **(06 Marks)**

b. Elaborate the concept of P-well faloricaton with neat sketches. **(10 Marks)**

c. Compare CMOS and bipolar technologies. **(04 Marks)**

2 a. Obtain the transfer characteristics of a CMOS inverter and mark all the regions. Showing the status of PMOS and NMOS transistors. **(10 Marks)**

b. Illustrate the schematic and stick diagram for the expression $Y = \overline{A(B+C)}$. **(10 Marks)**

3 a. Discuss in detail the λ - based design for CMOS. **(10 Marks)**

b. Realize a 3-input NAND gate for clocked CMOS logic and also for CMOS domino logic. **(06 Marks)**

c. Discuss the working of pseudo nMOS logic with suitable example. **(04 Marks)**

4 a. Describe the delay unit τ in terms of sheet resistance and area capacitance for the CMOS inverter pain shown, calculate the total delay. **(08 Marks)**

Fig. Q4(a)

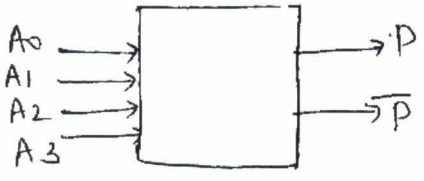
b. Explain in brief the wiring capacitances. **(06 Marks)**

c. Narrate the steps involved in calculate the sheet resistance of :
i) Transistor channel ii) nMOS inverter iii) CMOS inverter. **(06 Marks)**

PART – B

5 a. What are the scaling factors for the following device parameters :
i) Gate capacitance c_g ii) max-operating frequency f_0 iii) current density iv) power dissipation per gate p_g v) power speed product PT. **(10 Marks)**

b. Design a parity generator with the following specifications and draw the stick diagram of one basic cell. **(10 Marks)**



$$P = \begin{cases} 1, & \text{even numbers of 1's} \\ 0, & \text{odd numbers of 1's} \end{cases}$$

Fig. Q5(b)

6	a.	Draw the basic form of a two-phase clock generator and explain in detail.	**(08 Marks)**
	b.	Discuss the architectural issues to be followed in the design of a VLSI subsystem.	**(06 Marks)**
	c.	Explain the precharge bus approach used in system design.	**(06 Marks)**
7	a.	Explain the three transistor dynamic RAM cell.	**(10 Marks)**
	b.	Discuss the Bangh-Wooley method used for two's complement multiplication.	**(10 Marks)**
8	a.	Narrate the meaning of "Real Estate" in VLSI design.	**(05 Marks)**
	b.	Explain testing and testability in detail.	**(10 Marks)**
	c.	Write a short note on scan design techniques.	**(05 Marks)**

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