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10AL51

Fifth Semester B.E. Degree Examination, June/July 2013
Management and Entrepreneurship

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Define management. Write various characteristics of management. **(05 Marks)**
b. Write various roles of a manager. **(05 Marks)**
c. Explain any two important modern management approaches. **(10 Marks)**

2 a. Write differences between strategic planning and tactical planning. **(05 Marks)**
b. Explain various types of decisions. **(05 Marks)**
c. Explain various steps of planning. **(10 Marks)**

3 a. Explain the various sources of recruitment. **(05 Marks)**
b. Write advantages and disadvantages of line and staff organization. **(05 Marks)**
c. Write various principles of organization. **(10 Marks)**

4 a. Write differences between coordination and cooperation. **(05 Marks)**
b. Write differences among autocratic, participative and Free-Rein Leadership styles. **(05 Marks)**
c. Explain various methods of establishing control. **(10 Marks)**

PART – B

5 a. Write differences among Intrapreneur, Entrepreneur and Manager. **(05 Marks)**
b. Write important qualities of an entrepreneur. **(05 Marks)**
c. Explain various stages in entrepreneurial process. **(10 Marks)**

6 a. Write various characteristics of SSIs. **(05 Marks)**
b. Write functions of WTO. **(05 Marks)**
c. Explain various steps to start a SSI. **(10 Marks)**

7 a. Write functions of TECSOK. **(05 Marks)**
b. Write functions of SIDBI. **(05 Marks)**
c. Write objectives, functions and single window concept of District Industries Centre. **(10 Marks)**

8 a. Write various points to be considered for project identification. **(05 Marks)**
b. Write differences between PERT and CPM. **(05 Marks)**
c. Explain various aspects of project feasibility studies. **(10 Marks)**

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

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10EC52

Fifth Semester B.E. Degree Examination, June/July 2013
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 filter tables not permitted.***

PART – A

1 a. Define DFT. Derive the relationship of DFT to the z-transform. **(05 Marks)**

b. An analog signal is sampled at 10 kHz and the DFT of 512 samples is computed. Determine the frequency spacing between the spectral samples of DFT. **(03 Marks)**

c. Consider the finite length sequence $x(n) = \delta(n) - 2\delta(n-5)$:
Find i) The 10 point DFT of x(n) ii) The sequence y(n) that has a DFT $y(K) = e^{-\frac{j4\pi}{10}K} X(K)$ where X(K) is the 10 point DFT of x(n) iii) The 10 point sequence y(n) that has a DFT Y(K)=X(K)W(K) where X(K) is the 10 point DFT of x(n) and W(K) is the 10 point DFT of u(n) – u(n-6). **(12 Marks)**

2 a. Determine the circular convolution of the sequences x(n)={1, 2, 3, 1} and h(n)={4, 3, 2, 2} using DFT and IDFT equations. **(08 Marks)**

b. Let X(K) be a 14 point DFT of a length 14 real sequence x(n). The first 8 samples of X(K) are given by: X(0) = 12, X(1) = –1 + J3, X(2) = 3 + j4, X(3) = 1–J5, X(4) = –2+J2, X(5) = 6+J3, X(6) = –2 – J3, X(7) = 10.
Determine the remaining samples of X(K). Also evaluate the following functions without computing the IDFT.

i) x(0) ii) x(7) iii) $\sum_{n=0}^{13} x(n)$ iv) $\sum_{n=0}^{13} |x(n)|^2$ **(12 Marks)**

3 a. Consider a FIR filter with impulse response, h(n) = {3, 2, 1, 1}. If the input is x(n) = {1, 2, 3, 3, 2, 1, –1, –2, –3, 5, 6, –1, 2, 1}, using the overlap save method and 8 point circular convolution. **(10 Marks)**

b. What are FFT algorithms? Prove the i) Symmetry and ii) Periodicity property of the twiddle factor W_N. **(06 Marks)**

c. How many complex multiplications and additions are required for computing 256 point DFT using FFT algorithms? **(04 Marks)**

4 a. Find the DFT of the sequence $x(n) = \{1, 2, 3, 4, 4, 3, 2, 1\}$ using the decimation in frequency FFT algorithm and draw the signal flow graph. Show the outputs for each stage. **(10 Marks)**

b. Given x(n) = {1, 0, 1, 0}, find x(2) using the Goertzel algorithm. **(05 Marks)**

c. Write a note on chirp z transform algorithm. **(05 Marks)**

PART – B

5 a. Given that $|H(e^{7\Omega})|^2 = \frac{1}{1+64\Omega^6}$, determine the analog Butterworth low pass filter transfer function. **(06 Marks)**

b. Design an analog Chebyshev filter with a maximum passband attenuation of 2.5 dB at $\Omega_P = 20$ rad/sec and the stopband attenuation of 30 dB at $\Omega_S = 50$ rad/sec. **(10 Marks)**

c. Compare Butterworth and Chebyshev filters. **(04 Marks)**

6 a. What are the conditions to be satisfied while transforming an analog filter to a digital IIR filter? Explain how this is achieved in Bilinear transformation technique. **(05 Marks)**

b. Design a Butterworth filter using the impulse invariance method for the following specifications: Take T = 1 sec, $0.8 \le |H(e^{jW})| \le 1 \quad 0 \le W \le 0.2\pi$, $|H(e^{jW})| \le 0.2 \quad 0.6\pi \le W \le \pi$ **(10 Marks)**

c. Determine H(z) for the given analog system function $H(s) = \frac{(s+a)}{(s+a)^2 + b^2}$ by using Matched z-transform. **(05 Marks)**

7 a. A z-plane pole-zero plot for a certain digital filter shown in Fig. Q7 (a). Determine the system function in the $H(z) = \frac{(1+a_1z^{-1})(1+b_1z^{-1}+b_2z^{-2})}{(1+c_1z^{-1})(1+d_1z^{-1}+d_2z^{-2})}$ giving the numerical values for parameters a_1, b_1, b_2, c_1, d_1 and d_2. Sketch the direct form II and Cascade realizations of the system. **(10 Marks)**

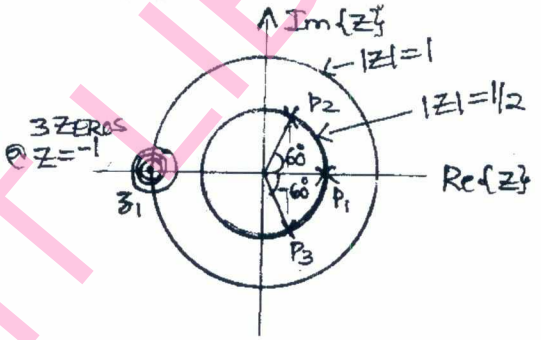

Fig. Q7 (a)

b. A FIR filter is given by, $y(n) = x(n) + \frac{2}{5}x(n-1) + \frac{3}{4}x(n-2) + \frac{1}{3}x(n-3)$. Draw the direct form I and lattice structure. **(10 Marks)**

8 a. Design a FIR filter (low pass) with a desired frequency response, $H_d(e^{JW}) = e^{-J3W}; \quad -\frac{3\pi}{4} \le \omega \le \frac{3\pi}{4}$

$= 0; \quad \frac{3\pi}{4} < |\omega| < \pi$

Use Hamming window with M = 7. Also obtain the frequency response. **(10 Marks)**

b. Design a linear phase low pass FIR filter with 7 taps and cutoff frequency of $\omega_C = 0.3\pi$ rad, using the frequency sampling method. **(10 Marks)**

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10EC53

Fifth Semester B.E. Degree Examination, June/July 2013

Analog Communication

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Explain the terms mean, correlation and covariance functions. **(09 Marks)**

b. Explain the properties of Gaussian process. **(06 Marks)**

c. The PSD of a random process X(t) is shown in Fig.Q1(c).

i) Determine and sketch the autocorrelation function $R_X(\tau)$ of X(t).

ii) What is the power contained in X(t)?

iii) What is the ac power contained in X(t)?

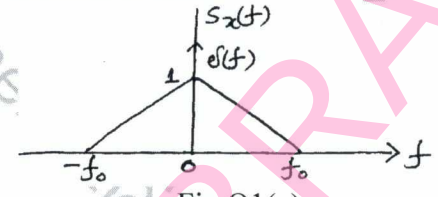

Fig.Q1(c) **(05 Marks)**

2 a. Explain the operation of the envelope detector with circuit diagram and waveforms. **(08 Marks)**

b. What is the significance of double side band suppressed carrier modulation? Explain with time domain description. **(04 Marks)**

c. Explain the operation of the Ring modulator circuit which generates the DSBSC waves. **(08 Marks)**

3 a. Explain the operation of quadrature carrier multiplexing scheme with transmitter and receiver diagrams. **(08 Marks)**

b. With a block diagram approach, explain the phase discrimination method for generating SSB modulated wave. **(08 Marks)**

c. Explain the demodulation of SSB waves with a block diagram and mathematical expressions. **(04 Marks)**

4 a. What is an importance of the vestigial sideband system? Explain the spectrum of VSB modulated wave containing a vestige of the lower sideband with frequency domain description. **(06 Marks)**

b. Give comparison of amplitude modulation techniques. **(06 Marks)**

c. With a block-diagram approach, explain the operation of the frequency division multiplexing scheme. **(08 Marks)**

PART – B

5 a. What are the advantages of frequency modulation? Give relationship between frequency modulation and phase modulation, with scheme for generating an FM wave by using a phase modulator and also scheme for generating a PM wave by using a frequency modulator. **(07 Marks)**

5 b. With block diagram approach, explain the generation of wideband FM wave by first generating narrow band FM wave then convert narrow band FM wave into wideband FM wave, using frequency multiplier. **(08 Marks)**

c. The equation of an FM wave is given as $S(t) = 10 \sin[5.7 \times 10^8 t + 5 \sin 12 \times 10^3 t]$. Calculate: i) Carrier frequency, ii) Modulating frequency, iii) Modulation index, iv) Frequency deviation, v) Power dissipated in 100 Ω load. **(05 Marks)**

6 a. Explain the operation of balanced discriminator with circuit diagram, and characteristics for the demodulation of FM signals. **(08 Marks)**

b. With a block diagram approach, explain the operation of FM stereo multiplexing with multiplexer in transmitter of FM stereo and demultiplexer in receiver of FM stereo. **(08 Marks)**

c. Briefly explain about the phase-locked loop. **(04 Marks)**

7 a. Explain briefly on the following:
i) Shot noise
ii) Thermal noise **(05 Marks)**

b. Derive an expression for equivalent noise temperature (Te) of overall circuit having number of amplifiers connected in cascade connection. **(07 Marks)**

c. Three amplifiers have following characteristics:
Amplifier 1: $F_1 = 8$ dB, $G_1 = 42$ dB
Amplifier 2: $F_2 = 9$ dB $G_2 = 38$ dB
Amplifier 3: $F_3 = 5$ dB $G_3 = 22$ dB
The amplifiers are connected in tandem. Determine which combination gives the lowest noise factor referred at input. **(08 Marks)**

8 a. Considering the model of DSBSC receiver using coherent detection, explain the noise in DSBSC receivers. **(08 Marks)**

b. An FM receiver receives an FM signal $S(t) = 10 \cos [2\pi \times 10^8 t + 6 \sin (2\pi \times 10^3 t)]$. Calculate the figure of merit of this receiver. **(04 Marks)**

c. With circuits and characteristics, explain the importance of pre-emphasis and de-emphasis in FM system. Explain the operation briefly. **(08 Marks)**

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10EC54

Fifth Semester B.E. Degree Examination, June/July 2013

Microwaves and Radar

Time: 3 hrs. Max. Marks:100

Note: 1. ***Answer FIVE full questions, selecting at least TWO questions from each part.***
2. ***Use of Smith chart is permitted.***

PART – A

1 a. Staring from the fundamentals, derive the expression for the voltage and current at any point on the transmission line. **(10 Marks)**

b. An open wire line has R = 10 Ω′s/km, L = 0.0037 henry/km, C = 0.0083 μf/km, G = 0.4 μ℧/km. Determine Z_o, α, β, γ, V_p if w = 1000 radians/sec. **(05 Marks)**

c. Define the following:
i) Reflection coefficient ii) Transmission coefficient.
Also, derive the relationship between them? **(05 Marks)**

2 a. With a neat diagram, explain the working of a two-hole directional coupler. Also derive the Scattering matrix of the same. **(10 Marks)**

b. A load impedance of 26-j16Ω′s is required to be connected to a line of characteristic impedance 100 Ω′s by using a short circuited stub of length, l located at a distance, d from the load. The wavelength of operation is 1 m. Using Smith chart find d and l. Write the procedural steps. **(10 Marks)**

3 a. With a neat diagram, explain the construction, working and application of an Isolator based on faraday rotation. **(10 Marks)**

b. An IMPATT diode has the following parameters:
Carrier drift velocity, $V_d = 2 \times 10^7$ cm/s
Drift region length, L = 6 μm
Maximum operating voltage = 100 V
Maximum operating current = 200 mA
Efficiency, η = 15%
Breakdown voltage, V_{bd} = 90 V
Compute: i) Maximum output power, ii) Resonant frequency. **(05 Marks)**

c. A typical Silicon BARRIT diode has the following parameters:
Relative dielectric constant, $\epsilon_r = 12.5$
Donor concentration, $N = 3.2 \times 10^{22}/m^3$, $\epsilon_o = 8.854 \times 10^{-12}$
Drift length, L = 8 μm
Calculate: i) Critical voltage, ii) Breakdown voltage, iii) Breakdown electric field. **(05 Marks)**

4 a. Explain with a neat diagram the construction and working of PIN diode and Schottky barrier diode. **(10 Marks)**

b. Explain S-matrix representation of multi-port network. **(04 Marks)**

c. State and explain the properties of S-matrix. **(06 Marks)**

PART – B

5 a. With a neat diagram, explain the working of a precision type variable attenuator. **(06 Marks)**

b. With a neat diagram, explain the working of a E-plane Tee junction. Also derive its Scattering matrix. **(10 Marks)**

c. A three port circulator has an insertion loss of 2 dB, isolation loss of 25 dB and VSWR = 2.0. Find the S-matrix. **(04 Marks)**

6 a. Explain the construction and field pattern for microstrip line. **(08 Marks)**

b. What are the different losses taking place in microstrip line? Explain. **(06 Marks)**

c. Compare strip line and microstrip line. **(06 Marks)**

7 a. Starting from the power density of an isotropic antenna, derive an expression for the Radar-range equation. Also, explain the factors influencing the maximum range of the radar. **(10 Marks)**

b. Define the following related to radar system:
   i) Maximum unambiguous range
   ii) Doppler effect
   iii) Blind speed
   iv) Duty cycle **(04 Marks)**

c. A 10 GHz Radar has the following characteristics:
   Peak transmitter power = 250 KW
   p.r.f. = 1500 PPS
   Pulse width = 0.8 μsec
   Power gain of the antenna = 2500
   Minimum detectable peak signal power by receiver = 10^{-14} watts
   Effective area of the antenna = 10 m^2.
   If this radar were to be used to detect a target of $2m^2$ equivalent cross section, find the following:
   i) Maximum possible range
   ii) Unambiguous range
   iii) Duty cycle
   iv) Average power **(06 Marks)**

8 a. With a neat block diagram, explain the principle and working of an MTI Radar. **(08 Marks)**

b. Am MTI Radar used PRF of 1000 PPS at 4 GHz. Compute the lowest blind speed of the Radar. Also calculate the second and third lowest blind speed of the radar. **(04 Marks)**

c. Write brief note on any TWO:
   i) Delay line canceller
   ii) CW Doppler Radar
   iii) Pulsed Radar system
   iv) Various applications of Radar. **(08 Marks)**

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10EC56

Fifth Semester B.E. Degree Examination, June/July 2013
Fundamental 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. Explain the steps involved in fabrication of p-well CMOS transistor with the help of neat diagram. **(06 Marks)**

b. Write the steps involved in production of E-beam masks. **(04 Marks)**

c. Draw the graphs for relationship between Vgs and Ids at a fixed and Vds for enhancement and depletion type pMOS and nMOS transistor. **(04 Marks)**

d. Derive the expression for Vin (switching point voltage) in the region C of CMOS inverter. **(06 Marks)**

2 a. Draw the stick diagram for $F = \overline{AB + CD}$ using the nMOS design style. Explain the procedure. **(08 Marks)**

b. Indicate and draw design rule for diffusion layers and metal layers. **(06 Marks)**

c. Draw the cross section of buried contact. What are the advantages of lambda base design rule? **(06 Marks)**

3 a. Obtain the logical efforts and parasitic capacitance of CMOS 2-input NOR gate. **(06 Marks)**

b. What is Ganged CMOS logic? Explain with example. How it behave like pseudo NMOS logic, static CMOS logic. **(06 Marks)**

c. Explain Bi-CMOS circuit with example. What are the advantages and disadvantages of this circuit? **(08 Marks)**

4 a. Calculate the capacitance of the structure given below as in Fig. Q4 (a). **(08 Marks)**

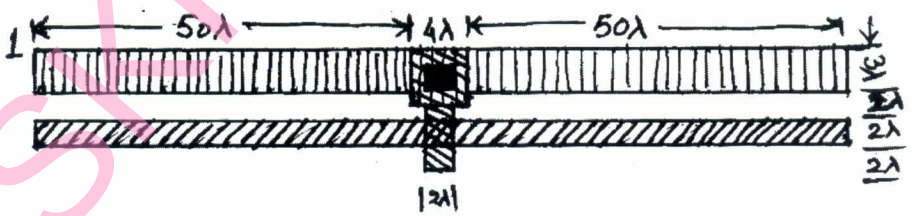

Fig. Q4 (a)

b. Obtain the scaling factor for the following device parameters:
i) Gate capacitance per unit area.
ii) Gate area.
iii) Gate capacitance.
iv) Parasitic capacitance.
v) Carrier density in the channel. **(05 Marks)**

c. Discuss the limitation of scaling on substrate doping and depletion width. **(07 Marks)**

PART – B

5 a. Explain the following with any suitable circuit schematic and with their salient feature:
i) Pseudo nMOS logic ii) Dynamic logic iii) Cascade voltage switch logic
iv) Domino logic **(10 Marks)**

b. Design n-bit parity generator in detail with relevant nMOS stick diagram. **(10 Marks)**

6 a. What are the guidelines for good VLSI design and problems associated with VLSI design? **(10 Marks)**

b. Obtain the logical functions that can be derived from 'Adder'. **(06 Marks)**

c. Draw the Manchester carry-chain element with expression for inputs and outputs. **(04 Marks)**

7 a. Draw and explain the CMOS Pseudo static memory cell. **(06 Marks)**

b. What are the timing considerations in system design? **(06 Marks)**

c. Explain six transistor dynamic memory cell and also signify the importance of sense amplifier. **(08 Marks)**

8 Write short notes on :

a. Input / output (I/O) pads.

b. Observability and controllability.

c. Boundary Scan Test (BST).

d. Built-in-Self test. **(20 Marks)**

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