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06AL51

Fifth Semester B.E. Degree Examination, May/June 2010
Management and Entrepreneurship

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. What is management? Write various characteristics of management. **(07 Marks)**
b. Explain how management is science or art or profession. **(06 Marks)**
c. Explain in brief the various roles a manager plays. **(07 Marks)**

2 a. Explain the importance of planning. **(05 Marks)**
b. Differentiate between strategic planning and tactical planning. **(05 Marks)**
c. Write various steps in planning and planning premises. **(10 Marks)**

3 a. What are the various principles of organization? **(10 Marks)**
b. Explain the selection process of personnel. **(10 Marks)**

4 a. Discuss various principles of directing. **(06 Marks)**
b. Compare autocratic, participative and free-rein leadership styles. **(07 Marks)**
c. Write in brief, various methods of establishing control. **(07 Marks)**

PART – B

5 a. Classify various categories of entrepreneurship, based on different factors. **(06 Marks)**
b. Explain various stages in entrepreneurial process. **(08 Marks)**
c. List out different barriers of entrepreneurship. **(06 Marks)**

6 a. Define SSI. Enumerate various objectives of SSI. **(08 Marks)**
b. List various steps to start a SSI. **(08 Marks)**
c. Define ancillary industry and tiny industry. **(04 Marks)**

7 a. Write various functions of DIC. **(06 Marks)**
b. Enumerate functions of SISI. **(08 Marks)**
c. Explain the role of KSFC in setting up of industries. **(06 Marks)**

8 a. Explain various factors to be considered for selection of a project. **(06 Marks)**
b. List out various contents of a project report. **(06 Marks)**
c. Write various points to be considered for,
i) Technical feasibility study and **(04 Marks)**
ii) Social feasibility study. **(04 Marks)**

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06EC52

Fifth Semester B.E. Degree Examination, May/June 2010
Digital Signal Processing

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. For the following sequences, find: **(12 Marks)**

i) N-point DFT of $x(n) = \cos\frac{2\pi}{N}K_o n$ ii) 5-point DFT of $x(n) = \{1, 1, 1\}$

b. Find IDFT for the sequence : $x(k) = \{5, 0, (1 - j), 0, 1, 0, (1 + j), 0\}$ **(08 Marks)**

2 a. State and prove circular frequency shift property of DFT. **(04 Marks)**

b. Compute the circular convolution of the sequences $x_1(n) = \{2, 1, 2, 1\}$ and $x_2(n) = \{1, 2, 3, 4\}$ using DFT and IDFT method. **(08 Marks)**

c. Find the output y(n) of a filter whose impulse response is $h(n) = \{1, 2\}$ and the input signal to the filter is $x(n) = \{1, 2, -1, 2, 3, -2, -3, -1, 1, 1, 2, -1\}$ using overlap-save method. **(08 Marks)**

3 a. Determine the number of complex multiplications, complex additions and trigonometric functions, required for direct computation of N-point DFT, **(10 Marks)**

b. How many complex multiplications and additions are required for 64-point DFT in FFT? **(04 Marks)**

c. Prove : i) Symmetry and ii) Periodicity property of a twiddle factor. **(06 Marks)**

4 a. Develop Radix-2 N-point DIT-FFT algorithm and draw the signal flow graph. **(12 Marks)**

b. Obtain 8-point DFT of the sequence, $x(n) = \{2, 1, 2, 1, 0, 0, 0, 0\}$. Using Radix-2 DIF-FFT algorithm. Show clearly all the intermediate results. **(08 Marks)**

PART – B

5 a. Given $|Ha(j\Omega)|^2 = \frac{1}{1+16\Omega^4}$, determine the analog filter system function Ha(S). **(08 Marks)**

b. Derive an expression for 'N' and Ω_{cp} of Butterworth filter if passband and stopband attenuations are in dB. **(08 Marks)**

c. Let $H(s) = \frac{1}{s^2+s+1}$ represents transfer function of a low pass filter with a passband of 1 rad/sec. Use frequency transformation to find the transfer function of the following analog filters:

i) A LPF with $\Omega'p = 10$ rad/sec ii) A HPF with $\Omega'p = 100$ rad/sec. **(04 Marks)**

6 a. Derive an expression for frequency response of a symmetric impulse response for N-odd. **(08 Marks)**

6 b. A lowpass filter is to be designed with the following desired frequency response:

$$H_d(e^{j\omega}) = H_d(\omega) = \begin{cases} e^{-ijw}, & |\omega| < \pi/4 \\ 0, & \pi/4 < |\omega| < \pi \end{cases}$$

Determine the filter coefficients $h_d(n)$ and $h(n)$ if $\omega(n)$ is a rectangular window defined as follows:

$$W_R(n) = \begin{cases} 1, & 0 \le n \le 4 \\ 0, & \text{otherwise} \end{cases}$$

Also, find the frequency response, $H(\omega)$ of the resulting FIR filter. **(12 Marks)**

7 a. Derive the expression for the bilinear transformation, to transform an analog filter to a digital filter, by trapezoidal rule and explain the mapping from s-plane to z-plane. **(08 Marks)**

b. Convert the analog filter with system function $Ha(s) = \frac{(s+0.1)}{(s+0.1)^2+9}$ into a digital filter (IIR) by means of impulse invariance method. **(08 Marks)**

c. Given the analog transfer function, $H(s) = \frac{(s+2)}{(s+1)+(s+3)}$. Find H(z), using matched z-transform design. The system uses sampling rate of 10Hz (T = 0.1 sec). **(04 Marks)**

8 a. Obtain direct form I, direct form II, cascade and parallel structure for the system described by $y(n) = -0.1y(n-1) + 0.72y(n-2) + 0.7x(n) - 0.252x(n-2)$. **(16 Marks)**

b. Obtain the direct form realization of linear phase FIR system given by $H(z) = 1 + \frac{2}{3}z^{-1} + \frac{15}{8}z^{-2} + \frac{2}{3}z^{-3} + z^{-4}$. **(04 Marks)**

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06EC53

Fifth Semester B.E. Degree Examination, May/June 2010
Analog Communication

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Define with relevant equations mean, autocorrelation and auto covariance of a random process X (t). **(06 Marks)**

b. The probability density function (PDF) of a random variable is given as

$f_X(u) = K$ for u between 2 and 4

0 otherwise; K is a constant

Sketch : i) PDF ; ii) Determine the value of K ; iii) Find $P(x \leq 3.5)$. **(06 Marks)**

c. Define the power spectral density and explain its properties. **(08 Marks)**

2 a. Show that a square law can be used for the detection of an A.M. wave. **(06 Marks)**

b. Consider a message signal $m(t) = 20 \cos(2\pi t)$ volts ;
and a carrier signal $c(t) = 50 \cos(100 \pi t)$ volts.

i) Sketch to scale resulting AM wave for 75% modulation.

ii) Find the power developed across a load of 100 Ω due to this AM wave. **(06 Marks)**

c. Explain the method of obtaining a practical synchronous receiving system with BSBSC modulated waves using costas loop. **(08 Marks)**

3 a. With a neat block diagram, explain how SSB wave is generated using phase shift method. **(08 Marks)**

b. For the rectangular pulse shown in Fig.3(b), evaluate its Hilbert transform. **(04 Marks)**

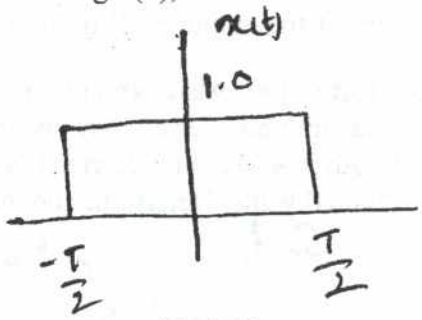

Fig.3(b)

c. Consider a 2-stage SSB modulator as shown in Fig.3(C). The i/p signal consists of voice signal in a frequency range of 0.3 to 3.4 kHz. The two oscillator frequencies have values $f_1 = 100$ kHz and $f_2 = 10$ MHz. Specify the following:

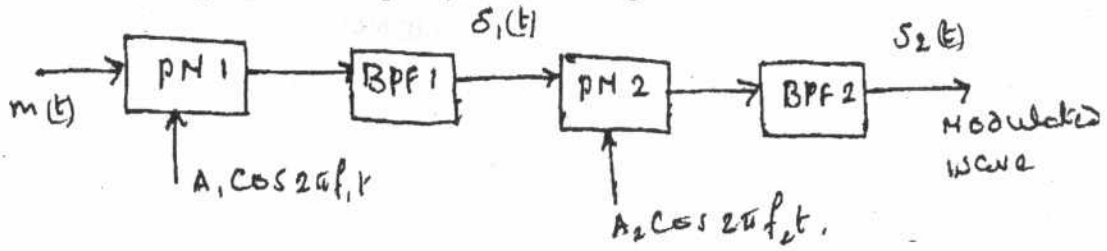

Fig.3(c)

i) Sidebands of DSBSCmodulated waves appearing at the outputs of the product modulation (PM).
ii) Side bands of SSB modulated waves appearing at two BPF outputs.
iii) The pass bands and guard bands of the two BPFs. **(08 Marks)**

4 a. Explain the scheme for generation and demodulation of VSB waves with relevant block diagrams and mathematical expression. **(08 Marks)**
b. With a neat block diagram, explain the operation of FDM technique. **(06 Marks)**
c. With a neat block diagram, explain the operation of AM super heterodyne receiver. **(06 Marks)**

PART – B

5 a. Derive an expression for single tone sinusoidal FM wave; find its spectrum. **(10 Marks)**
b. A sinusoidal modulating voltage of amplitude 5V and frequency 1 kHz is applied to frequency modulator. The frequency sensitivity of modulator is 40 Hz/V. The carrier frequency is 100 kHz. Calculate: i) Frequency deviator ; ii) Modulation index. **(05 Marks)**
c. Explain the methods of FM generation. **(05 Marks)**

6 a. Starting from block diagram of PLL obtain its non linear and linear model. Show that output of PLL is scaled version modulating signal. **(12 Marks)**
b. Explain with relevant block diagram FM stereo multiplexing. **(08 Marks)**

7 a. Define noise figure and explain its significance. **(06 Marks)**
b. Define noise equivalent band width. Derive the expression for the same. **(08 Marks)**
c. Two 2-port devices are connected in cascade. For the first stage, noise figure and available power gain are 5 db and 12 db respectively. For the second stage the corresponding values are 15 db and 10 db. Determine the over all noise figures in db. **(06 Marks)**

8 a. Derive the expression for the output SNR of an AM receiver using envelope detector. **(08 Marks)**
b. Explain threshold effect in FM. Also explain how it is minimized. **(06 Marks)**
c. A DSBSC signal is transmitted over a noisy channel with PSD of noise as shown in Fig.8(c). The message bandwidth is 4 kHz and carrier frequency is 200 kHz. Assume average power of the modulated wave 10 watts. Determine the output SNR of the receiver. **(06 Marks)**

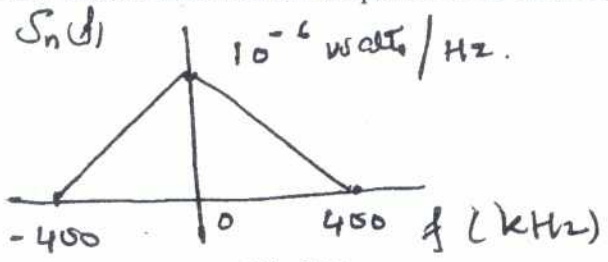

Fig.8(c).

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06EC54

Fifth Semester B.E. Degree Examination, May/June 2010
Microwaves and Radar

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Derive an expression for reflection coefficient and transmission coefficient in the transmission line. **(08 Marks)**

b. What are the applications of Smith chart? Explain briefly. **(06 Marks)**

c. A transmission line having a length of 25 KM is terminated in its characteristic impedance. At a specified frequency, the voltage at a distance of 1 KM from the line is 10% below that of the sending end voltage. Compute the value of the load-end voltage, if the sending end voltage is 40 V. **(06 Marks)**

2 a. With a schematic diagram, explain the directional coupler. Derive an expression and give scattering matrix representation of the directional coupler. **(08 Marks)**

b. With a neat diagram, explain the operation of ferrite rotation isolator. **(06 Marks)**

c. A rectangular – waveguide cavity filled with a dielectric of constant $\epsilon_r = 4$ has a breadth of 4 cm and height of 2 cm. Find the length of the cavity to procedure resonance at 4 GHz. Assume $TE_{|0|}$ mode. **(06 Marks)**

3 a. Explain the principles of operation of the Gunn diode with formation of Gunn domain. And also briefly, explain the modes of operation of the Gunn diode with Gunn-oscillation modes. **(08 Marks)**

b. Explain the operation of the Schottky – barrier diode with its structure. Also explain the fabrication technique with sputtering of aluminium on silicon wafers. Draw the characteristics of Schotty – barrier diode and write its symbol. **(06 Marks)**

c. An Impatt diode operates at 150 V delivering 1A of current at 8% efficiency. Calculate the output power and duty cycle, if the device is operated in pulsed mode at 20 GHz with a pulse width of 0.5 ps. **(06 Marks)**

4 a. What are the different properties of Scattering parameters? Explain briefly. **(08 Marks)**

b. With necessary conditions write the Scattering matrix representation of multiport network generally. **(07 Marks)**

c. Express S – parameters in terms of impedance when two transmission lines are joined with characteristic impedances Z_1 and Z_2. **(05 Marks)**

PART – B

5 a. Explain the salient features of co-axial connectors and adaptors, with diagrams. **(06 Marks)**

b. Explain the characteristics of magic tee passive device, with a schematic diagram. Also obtain the S matrix representation of the magic-tee. **(08 Marks)**

c. With neat diagram of a microwave attenuator, explain the operation of the same. **(06 Marks)**

6 a. Explain the operation of microstriplines with its structure and Quasi TEM mode field distribution. **(07 Marks)**

b. With neat diagram, explain the operation of parallel strip line. And also write the expressions for distributed parameters of parallel strip line, characteristic impedance and attenuation of the same. **(07 Marks)**

c. A certain shielded stripline has W = 63.5 mm, t = 35 mm and d = 180 mm. It has a permittivity of 2.56. Compute its characteristic impedance, K factor and fringe capacitance. **(06 Marks)**

7 a. Derive an expression for the basic form of radar – range equation and hence explain the factors influencing the maximum range of radar. **(08 Marks)**

b. Calculate the maximum range of radar which operates at a frequency of 10 GHz, peak pulse power of 600 kW, if the antenna effective area is $5m^2$ and the area of target is 20 m^2. Minimum receivable power is 10^{-13} watt. **(06 Marks)**

c. What are the applications of radar? Explain each application briefly. **(06 Marks)**

8 a. With block diagram approach, explain the operation of the moving – target indicator (MSI) radar. **(07 Marks)**

b. Explain the basic principles of continuous – wave Doppler radar with block-diagram approach. Also mention the advantages and disadvantages of CW Doppler radar. What are the applications of CW Doppler radar? **(07 Marks)**

c. A moving target indicator radar uses a PRF (pulse repitation frequency) of 1000 Hz at 4 GHz. Compute the lowest blind speed of the radar. Also calculate the second and third lowest blind speeds of the radar. **(06 Marks)**

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06EC56

Fifth Semester B.E. Degree Examination, May/June 2010
Fundamentals of CMOS VLSI

Time: 3 hrs. Max. Marks:100

Note: ***1. Answer any FIVE full questions, selecting at least TWO questions from each part.***
2. Draw neat diagrams.

PART – A

1 a. Explain the fabrication steps in P-well CMOS fabrication. **(10 Marks)**
b. Obtain the de transfer characteristics of a CMOS inverter and mark all the regions showing the status of PMOS and NMOS. **(10 Marks)**

2 a. Compare CMOS and bipolar technologies. **(04 Marks)**
b. Explain the transmission gate operation. **(04 Marks)**
c. Draw λ-based design rules for double metal CMOS process for layers and transistors. **(08 Marks)**
d. Draw the circuit diagram and stick diagram for nand gate. **(04 Marks)**

3 a. Explain different types of pseudo – NMOS logic. **(07 Marks)**
b. Explain CMOS domain logic and derive the evaluation voltage equation. **(08 Marks)**
c. Explain 2-input x-nor gate in pass transistor logic. **(05 Marks)**

4 a. Explain the terms : i) Rise time ; ii) Fall time ; iii) Delay time. Derive the equations for fall time of CMOS inverter. **(08 Marks)**
b. Provide scaling factors for gate area, gate delay, sat current. **(06 Marks)**
c. Explain in brief the wiring capacitances. **(06 Marks)**

PART – B

5 a. Explain the restoring logic, in detail. **(04 Marks)**
b. How to implement the switch logic for 4-way multiplexer? Explain. **(08 Marks)**
c. Explain the pre charge bus approach, used in system design. **(08 Marks)**

6 a. Explain the 4 x 4 cross bar switch operation. Mention the salient features of sub system design process. **(08 Marks)**
b. Explain the design steps for A 4-bit adder. **(06 Marks)**
c. How can 4-bit ALU architecture be used to implement an adder? **(06 Marks)**

7 a. Explain the read and write operations in dynamic memory cell. **(06 Marks)**
b. Explain booth multiplier, with an example. **(08 Marks)**
c. Explain different types of I/O pads. **(06 Marks)**

8 a. Write a note on testability and testing. **(10 Marks)**
b. Explain the ground rubs for a system design. **(10 Marks)**

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