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06AL51

Fifth Semester B.E. Degree Examination, December 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. Define management. Explain the contributions of Taylor to the scientific management. **(10 Marks)**

b. Briefly explain, whether management is a science or art. **(10 Marks)**

2 a. Briefly explain the important steps in planning. **(10 Marks)**

b. Explain the hierarchy of plans. **(10 Marks)**

3 a. Briefly explain the principles of organization. **(10 Marks)**

b. Briefly explain the steps in the selection procedure. **(10 Marks)**

4 a. Briefly explain the Maslow's hierarchy of needs. **(10 Marks)**

b. Briefly explain some of the methods of establishing control. **(10 Marks)**

PART – B

5 a. Define the term 'Entrepreneur'. Explain the functions of an entrepreneur. **(10 Marks)**

b. Explain the steps involved in the entrepreneurial process. **(10 Marks)**

6 a. Define "small scale industry" and state the characteristics of a SSI. **(10 Marks)**

b. Explain the WTO. State its functions. **(10 Marks)**

7 a. What is the meaning of a "project". State and explain the classification of projects. **(10 Marks)**

b. Explain the project appraisal and its methods. Briefly explain any two methods. **(10 Marks)**

8 Write short notes on the following :

a. SISI

b. Barriers in entrepreneurship

c. SIDBI

d. Project identification **(20 Marks)**

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06EC52

Fifth Semester B.E. Degree Examination, December 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. Derive the DFT expression from the DTFT expression. **(05 Marks)**

b. A 498 point DFT of a real valued sequence x(n) has the following DFT samples given by : $X(0) = 2$, $X(11) = 7 + j3.1$, $X(K_1) = -2.2 - j1.5$, $X(112) = 3 + j0.7$, $X(K_2) = -4.7 + j1.9$, $X(249) = 2.9$, $X(309) = -4.7 - j1.9$, $X(K_3) = 3 - j0.7$, $X(412) = -2.2 + j1.5$ and $X(K_4) = 7 - j3.1$. The other samples have a value zero. Find the value of K_1, K_2, K_3 and K_4. **(05 Marks)**

c. Find the 4-point DFTs of the two sequences x(n) and y(n) using a single 4-point DFT : $x(n) = (1, 2, 0, 1)$ $y(n) = (2, 2, 1, 1)$ **(10 Marks)**

2 a. Let $x_p(n)$ be a periodic sequence with fundamental period N. If the N point DFT $(x_p(n)) = X_1(K)$ and 3N point DFT $(xp(n)) = X_3(K)$:

i) Find the relationship between $X_1(K)$ and $X_3(K)$

ii) Verify the above result for {2, 1} and {2, 1, 2, 1, 2, 1} **(10 Marks)**

b. For the two sequences $x_1(n) = (2, 1, 1, 2)$ and $x_2(n) = (1, -1, -1, 1)$, compute the circular convolution using DFT and IDFT. **(10 Marks)**

3 a. Let $x(n) = (1, 2, 3, 4)$ with $X(K) = (10, -2+2j, -2, -2-2j)$. Find the DFT of $x_1(n) = (1, 0, 2, 0, 3, 0, 4, 0)$ without actually calculating the DFT. **(06 Marks)**

b. For : $\begin{cases} x(n) = 1 & 0 \le n \le 5, \\ = 0 & \text{otherwise,} \end{cases}$

let X(Z) be the Z transform of x(n). If X(Z) is sampled at

$Z = e^{j\left(\frac{2\pi}{4}\right)K}$ $\quad 0 \le K \le 3$

Sketch y(n) obtained as IDFT of X(K). **(06 Marks)**

c. Derive the Radix-2 algorithm for DIT-FFT for N = 8. **(08 Marks)**

4 a. Find the 8 point DFT of {2, 1, 2, 1} using DIF – FFT. Draw the signal flow graph for N = 8 with intermediate values, Stuff appropriate zeros. **(10 Marks)**

b. Find the output y(n) of a filter whose impulse response is h(n) = (1, -2, 1) and input signal x(n) = 3, 1, -2, 1, -1, 2, 4, 3, 6. Use a 8 point circular convolution using overlap-add method. **(06 Marks)**

c. Compute the IDFT of X(K) = (2, 0, 2, 0) using DIT-FFT. Use a 4 point DFT. **(04 Marks)**

PART – B

5 a. Derive the expression for N order of the fifth and cut-off frequency Ω_c for a lowpass Butterworth filter starting from the frequency domain specifications of a lowpass filter. **(08 Marks)**

5 b. Design an IIR digital filter using bilinear transformation. Use Chebyshev prototype to satisfy the following specifications:
   i) LPF with –2 dB cut-off at 100 Hz
   ii) Stopband attenuation of 20 dB or greater at 500 Hz
   iii) Sampling rate of 4000 samples/sec. **(12 Marks)**

6 a. Design an analog bandpass filter to meet the following frequency domain specifications:
   i) –3.0103 dB upper and lower cut-off frequency of 50 Hz and 20 KHz.
   ii) A stopband attenuation of atleast 20 dB at 20 Hz and 45 KHz.
   iii) Monotonic frequency response. **(10 Marks)**

   b. Find the poles of the polynomial of order 5. Find $H_5(S)$ and gain at $\Omega = 1$ rad/sec in dB, for a Butterworth filter. **(10 Marks)**

7 a. List the steps in the design procedure of a FIR filter using window functions. **(06 Marks)**

   b. A low pass filter is to be designed with the following desired frequency response:

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

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

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

   Also find the frequency response $H(\omega)$ of the FIR filter. **(10 Marks)**

   c. List the advantages and disadvantages of a FIR filter. **(04 Marks)**

8 a. Obtain the cascade and parallel form realization of :

$$H(Z) = \frac{1 + \frac{1}{4}Z^{-1}}{\left(1 + \frac{1}{2}Z^{-1}\right)\left(1 + \frac{1}{2}Z^{-1} + \frac{1}{4}Z^{-2}\right)}$$ **(12 Marks)**

   b. Realize the linear phase FIR filter having the following impulse response:

$$h(n) = \delta(n) + \frac{1}{4}\delta(n-1) - \frac{1}{8}\delta(n-2) + \frac{1}{4}\delta(n-3) + \delta(n-4)$$ **(08 Marks)**

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06EC53

Fifth Semester B.E. Degree Examination, December 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. State and explain three properties of autocorrelation function. **(10 Marks)**

b. Define mean and covariance functions. **(06 Marks)**

c. Le x(t) and y(t) be two jointly wide sense stationary processes. Show that cross correlation $R_{xy}(\tau) = R_{xy}(-\tau)$. **(04 Marks)**

2 a. What are DSBSC generation methods? Explain the generation of DSBSC using ring modulator in detail, with relevant diagrams. **(10 Marks)**

b. A modulating signal m(t) is given by $m(t) = \cos 100t + 2\cos 300t$:

i) Sketch the spectrum of m(t)

ii) Find and sketch the spectrum of DSBSC signal $2m(t)\cos 1000t$. **(10 Marks)**

3 a. Derive the expression for representing SSB containing upper side band in time domain. **(10 Marks)**

b. Let $S_{u(t)}$ denote SSB wave obtained by transmitting only upper side band and $\hat{S}_{u(t)}$ denote its Hilbert transform. Show that :

$$M(t) = \frac{2}{A_c}\left[\hat{S}_{u(t)}\cos 2\pi fct - S_{u(t)}\sin 2\pi fct\right]$$ **(05 Marks)**

c. Explain phase discrimination method for generating SSB. **(05 Marks)**

4 a. What is frequency translation? With spectrum diagram, explain the operation of frequency translation. **(10 Marks)**

b. What is FDM? Discuss the detailed scheme of FDM. **(10 Marks)**

PART – B

5 a. With a neat circuit diagram, describe the direct method of generating FM. Also explain feedback scheme for frequency stabilization of a frequency modulator in direct method. **(10 Marks)**

b. Given a single tone FM signal : $S(t) = 20\cos\left[2\pi 10^6 t + 2\sin 2\pi 10^4 t\right]$. Sketch FM spectrum for the carrier and first three sidebands and find B.W using Carsons' rule. The required Bessel function values are : $J_0(2) = 0.224$, $J_1(2) = 0.577$, $J_2(2) = 0.353$ and $J_3(2) = 0.129$. **(10 Marks)**

6 a. Explain demodulation of FM using balanced slope detector. **(10 Marks)**

b. An angle modulated signal is given by $S(t) = 5\cos(12000t)$ for $0 \le t \le 1$. Let the carrier frequency be 10000 rad/s.

i) If S(t) is an FM signal with k.f. = 500 radians/sec-volt, determine modulating signal m(t) over the interval $0 \le t \le 1$.

ii) Instead if S(t) is a PM signal with kp = 500 radians/volt, determine m(t) over $0 \le t \le 1$. **(05 Marks)**

c. For a WBEM if narrow band carrier $f_1 = 0.1$ MHz, second carrier $f_2 = 9.5$ MHz, O/P carrier frequency = 100 MHz and $\Delta f = 75$ KHz. Calculate multiplying factors n_1 and n_2 if NBFM deviation is 20 Hz. Draw the block diagram of the modulator. **(05 Marks)**

7 a. Define noise figure and explain its significance, with derivation. **(05 Marks)**

b. Obtain the expression for auto correlation function of filtered noise n(t) in case of :

i) Ideal low pass filtered white noise

ii) RC low pass filtered white noise. **(10 Marks)**

c. Two port devices are connected in cascade. For the first stage the noise figure and available power gain are 5 dB and 12 dB respectively. For the second stage the noise figure and power gain are 15 dB and 10 dB. Determine overall noise figure in dB. Also find equivalent noise temperature. **(05 Marks)**

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

b. Explain functioning of preemphasis and de-emphasis in FM system. **(10 Marks)**

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06EC54

Fifth Semester B.E. Degree Examination, December 2010
Microwaves and Radar

Time: 3 hrs. Max. Marks:100

Note: *1. Answer any FIVE full questions, selecting at least TWO questions from each part.*
2. Smith chart must be provided.
3. Standard notations are used.
4. Draw neat diagrams, wherever necessary.
5. Missing data may be suitably assumed.

PART – A

1 a. Define reflection coefficient. Derive the equation for reflection coefficient at the load end and at a distance 'd' from load end, starting from equation for Zl. **(10 Marks)**

b. A 300Ω lossless line is terminated in a load of $(600 + j300)\Omega$, operating at 600 MHz. Find SWR on the line. Design a single stub matching section, assuming main line and stub are of the same type (Use Smith chart). **(10 Marks)**

2 a. Briefly explain the following microwave devices :
i) Hybrid ring
ii) Two hole directional coupler. **(10 Marks)**

b. Write field components of TE_{10} mode inside a rectangular waveguide. Using this, derive the equation for power transmitted through the guide for the dominant mode in Z–direction. **(10 Marks)**

3 a. With the help of drift velocity graph and current waveform, explain the constructional feature and working of n-type GaAs diode. **(08 Marks)**

b. Write an explanatory note on read diode. **(06 Marks)**

c. An up converter parametric amplifier has the following parameters : Ratio of o/p frequency to signal frequency is 25, figure of merit = 10, factor of merit figure = 0.4, diode temperature = 350 K, T_o = 300 K. Find the power gain in dB, noise figure in dB and band width. **(06 Marks)**

4 a. Starting from the impedance matrix equation, prove the symmetry property of a reciprocal network. **(08 Marks)**

b. Two transmission lines of characteristic impedances Z_1 and Z_2 are jointed at plane PP'. Express S parameters in terms of impedances. **(08 Marks)**

c. Write relationship of ABCD parameters with S parameters. **(04 Marks)**

PART – B

5 a. Briefly explain the working of a precision rotary phase shifter, with the help of diagram and E – field components. **(09 Marks)**

b. A 20 MW power is fed into one collinear port 1 of a lossless H – plane tee junction. Calculate the power delivered through each port, when other ports are terminated in a matched load. **(06 Marks)**

c. How the magic tee can be used as an E-H tuner? Explain. (05 Marks)

6 a. Briefly explain dielectric losses and radiation losses in microstrip lines. (10 Marks)

b. Show that $Qd \cong \frac{1}{\tan\theta}$ for a microstrip line. (04 Marks)

c. A lossless parallel strip line has a conducting strip width of W. The substrate separating the two conducting strips has a relative dielectric constant of 6 and thickness d of 4mm. Calculate :

i) Required width W of conducting strip, inorder to have a characteristic impedance of 50 Ω.

ii) Strip line capacitance and inductance. (06 Marks)

7 a. Derive the simple radar range equation, starting from the power density of isotropic antenna. (08 Marks)

b. With the help of a neat block diagram, explain the working of pulse radar. (08 Marks)

c. Name some of the important applications of radar. (04 Marks)

8 a. With the help of a neat block diagram, explain power amplifier type MTI radar. (10 Marks)

b. Write explanatory notes on :

i) Blind speeds in MTI radar.

ii) Pulse Doppler radar. (10 Marks)

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06EC/TC55

Fifth Semester B.E. Degree Examination, December 2010
Digital Switching Systems

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Define the terms dB, dBw and dBm. **(04 Marks)**

b. An amplifier has an input resistance of 600 Ω and a resistive load of 75 Ω. When it has an r.m.s. input voltage of 100 m.v, the rms output current is 20 mA. Find the gain in dB. **(06 Marks)**

c. Draw a neat diagram of a four wire circuit and explain its working. **(10 Marks)**

2 a. What are the functions of MDF in a telephone exchange? How lime side and exchange side are interconnected? **(06 Marks)**

b. What are the facilities provided to the customer in electronic exchanges which can be controlled by him? **(06 Marks)**

c. With the help of a neat diagram, explain Marker control of cross – bar switch. What is its advantage over step by step control? **(08 Marks)**

3 a. Explain lost call system and delay system as applied to telecommunication switching. Give examples of application of each. **(06 Marks)**

b. During the busy hour, a group of trunks is offered 100 calls having an average duration of 3 minutes. One of the calls fails to find a free trunk. Find :
i) Traffic offered.
ii) Traffic carried.
iii) Grade of service. **(06 Marks)**

c. A full availability group of 10 trunks is offered a total traffic of 4 Erlang. Calculate the traffic carried by each of the first two trunks. **(08 Marks)**

4 a. What is grading? With the aid of a simple diagram, explain progressive grading. **(04 Marks)**

b. Design a grading for connecting 20 trunks to switches having ten outlets. Obtain the best grading scheme. **(06 Marks)**

c. Design a two stage switching network, connecting 200 in coming trunks to 200 outgoing trunks. Draw neat diagrams of possible networks. **(10 Marks)**

PART – B

5 a. Explain the SDH system. **(05 Marks)**

b. Explain T – S – T switch. **(05 Marks)**

c. A T – S – T network has 20 incoming and 20 outgoing PCM highways, each conveying 30 channels. The required grade of service is 0.01. Find the traffic capacity of the network for mode 1 and mode 2. **(10 Marks)**

6 a. Draw a neat diagram of the basic software architecture of a typical digital switching system, showing clearly the three distinct levels of control. What is the type of operating system used in digital switching system? What architectures are used for hardware and software? **(10 Marks)**

b. With a neat block diagram, explain the digital switch software classification. **(10 Marks)**

7 a. With the aid of a neat block schematic, show organizational interfaces of a typical central office (Telephone exchange). What is the function of customer bureau? **(10 Marks)**

b. What are the two categories of digital switch maintainability? **(04 Marks)**

c. Draw a typical problem reporting system for a digital switching environment. Briefly explain the same. **(06 Marks)**

8 Write short notes on the following :

a. Call processing software.

b. Characteristics of digital switching systems.

c. Power plant for central office.

d. Grade of service. **(20 Marks)**

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06EC56

Fifth Semester B.E. Degree Examination, December 2010
Fundamentals of CMOS VLSI

Time: 3 hrs. Max. Marks:100

Note:1. ***Answer any FIVE full questions, selecting atleast TWO questions from each of Part – A and Part - B.***
2. Missing data may be assumed suitably.

PART – A

1 a. What do you mean by static load inverters? Derive the output voltage for the pseudo inverter by discussing its DC transfer characteristics. **(08 Marks)**

b. In a 0.5μm process $\mu_n = 44.69 \times 10^{-3}\ m^2/V$, $t_{ox} = 14.1nm$ and the $(W/L) = \frac{30}{5}$. The NMos has $V_t = 0.71V$ and $V_{gs} = 1.5V$. At what levels of V_{ds} and i_d will the MOSFET reach pinch off mode? Hint : $(\varepsilon_{ox} = 3.9\varepsilon_0)$. **(06 Marks)**

c. What is the functionality of the circuit shown in fig. Q1(c). Is it correct method to connect the circuit as shown in figure Q1(c)? Justify your answer. **(06 Marks)**

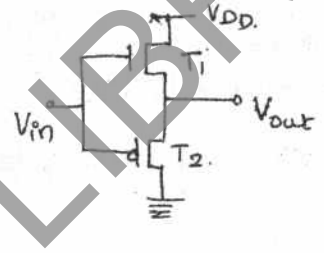


Fig. Q1(c)

2 a. Draw the Cmos circuit for half adder. (Hint : Sum = A ⊕ B, carry = AB, Inverted i/p^s are allowed). **(08 Marks)**

b. Draw the circuit diagram for the layout diagram shown in fig. Q2(b). **(08 Marks)**

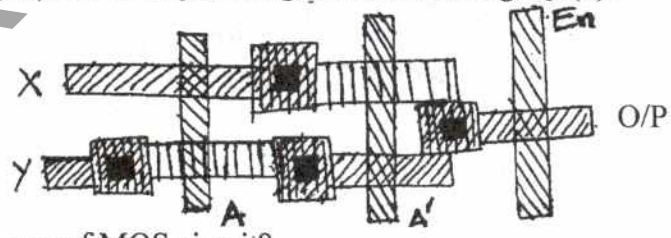


Fig. Q2(b)

c. What are the basic layers of MOS circuit? **(04 Marks)**

3 a. Explain the working principle of dynamic CMOS logic and clocked CMOS logic of "Nand" gate. **(12 Marks)**

b. Implement the pass transistor logic circuit for the expression Y = A + BC. Show the design steps clearly. **(08 Marks)**

4 a. Discuss the limitations of scaling. **(10 Marks)**

b. Derive the expression for total delay for N stage of NMOS and CMOS inverters by assuming the width factor f = e. **(10 Marks)**

PART - B

5 a. In the circuit shown in fig. Q5(a), find V1, V2, V3, V4 and V5. Justify your answer. **(08 Marks)**

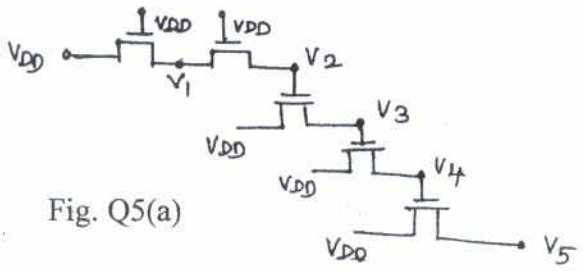


Fig. Q5(a)

b. Explain NMOS and CMOS non – inverting dynamic storage cell and draw the 3 – bit shift register using the CMOS dynamic storage cell. **(12 Marks)**

6 a. Draw and explain the 8 – bit carry select adder dividing it into m = 2 blocks. Calculate the completion time 'T' by assuming the one adder delay is 4ns and one mux delay is 2ns. **(12 Marks)**

b. Draw the block diagram and clearly show the switch connections to perform the logic operation of "OR" and "XOR" in a 3 – bit ALU using a standard adder element. **(08 Marks)**

7 a. Explain four transistor dynamic and six transistor static memory cells. Reason out the need for sense amplifier in the cell array. **(14 Marks)**

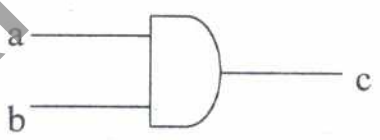
b. Explain the CMOS pseudo – static D flipflop. **(06 Marks)**

8 a. What is multiplexed D flipflop? Explain the general method for testing with scan path approach. **(08 Marks)**

b. What are the three important steps in sensitized path based testing? **(06 Marks)**

c. Find the test vectors to detect the stuck @ 0 and stuck @1 faults of "and" gate at its input and output node. Fig. 8(c). **(06 Marks)**

Fig. Q8(c)



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