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06AL51

Fifth Semester B.E. Degree Examination, Dec.09/Jan.10
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 Management

1 a. What is the scope of management? (05 Marks)
b. Bring out the differences between management and administration. (05 Marks)
c. Explain modern approaches to management. (10 Marks)

2 a. Explain the planning process. (05 Marks)
b. What are different types of plans? Explain. (05 Marks)
c. What are major drawbacks in planning? Explain. (10 Marks)

3 a. What are principles of organization? (05 Marks)
b. Bring out differences between centralization and decentralization of authority. (05 Marks)
c. Explain recruitment and selection process. (10 Marks)

4 a. Explain Maslow's theory of motivation. (05 Marks)
b. Explain any two types coordination techniques. (05 Marks)
c. Are leaders made or born? Justify. (10 Marks)

PART – B Entrepreneurship

5 a. Explain the meaning of 'Entrepreneur'. (04 Marks)
b. What are the functions of an 'Entrepreneur'? Explain. (06 Marks)
c. Briefly describe the role of entrepreneurs in economic development. (06 Marks)
d. Mention barriers to 'Entrepreneurship'. (04 Marks)

6 a. What are the objectives of SSI? Explain. (05 Marks)
b. Briefly write about government support to small scale enterprises, during five year plans. (10 Marks)
c. Explain advantages of WTO. (05 Marks)

7 a. Mention important central and Karnataka state government institutions providing support to SSIs. (05 Marks)
b. Write notes on any two:
i) Small Industries Development Organization (SIDO).
ii) National Small Industries Corporation limited (NSIC).
iii) Small Industries Development Bank of India (SIDBI). (10 Marks)
c. What are aims, objectives and functions of KIADB? (05 Marks)

8 a. Explain the need and significance of a project report. (05 Marks)
b. What are the guidelines by planning commission for a project report? Explain. (08 Marks)
c. Describe the project management technique 'PERT'. What are the advantages and the disadvantages of this technique? (07 Marks)

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06EC52

Fifth Semester B.E. Degree Examination, Dec.09/Jan.10
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. Consider the sequence $x_1(n) = \{0, 1, 2, 3, 4\}$, $x_2(n) = \{0, 1, 0, 0, 0\}$, $s(n) = \{1, 0, 0, 0, 0\}$ and their 5-point DFTs
   i) Determine a sequence y(n) so that $y(k) = x_1(k)x_2(k)$
   ii) Is there a sequence $x_3(n)$ such that $s(k) = x_1(k)x_3(k)$? **(10 Marks)**

   b. Suppose that we are given a program to find the DFT of a complex-valued sequence x(n). How can we use this program to find the inverse DFT of x(k)? **(04 Marks)**

   c. Consider the sequence $x(n) = 4\delta(n) + 3\delta(n-1) + 2\delta(n-2) + \delta(n-3)$. Let x(k) be the six point DFT of x(n). Find the finite length sequence y(n) that has a six point DFT $y(k) = W_6^{4k}x(k)$. **(06 Marks)**

2 a. State and prove time shifting property of DFT. **(08 Marks)**

   b. Explain how the DFT can be used to compute N equispaced samples of the Z transform, of an N-point sequence, on a circle of radius r. **(04 Marks)**

   c. A long sequence x(n) is filtered through a filter with impulse response h(n) to yield the output y(n), if $x(n) = \{1, 1, 1, 1, 1, 3, 1, 1, 4, 2, 1, 1, 3, 1\}$, $h(n) = \{1, -1\}$. Compute y(n) using overlap save techniques. [Use only 5 point circular convolution]. **(08 Marks)**

3 a. What is FFT? Explain Radix-2 DIT-FFT algorithm. **(06 Marks)**

   b. Develop decimation-in-frequency (DIF) FFT algorithm with all necessary steps and neat signal flow diagram used in computing N-point DFT, x(k) of a N-point sequence x(n). Using the same, compute the DFT of sequence $x(n) = \{1,1,1,1,1,1,1,1\}$. **(14 Marks)**

4 a. Let, $x(n) = \{1, 2, 0, 3, -2, 4, 7, 5\}$ with a 8-point DFT x(k). Evaluate the following without explicitly computing x(k):
   i) x(0) ii) x(4) iii) $\sum_{k=0}^{7} x(k)$ iv) $\sum_{k=0}^{7} |x(k)|^2$ **(08 Marks)**

   b. Let x(n) be a given sequence with N points with x(k) the corresponding DFT. Denote the operation of finding DFT as follows: $x(k) = F\{x(n)\}$. What is the resulting sequence x(n) operated upon four times. i.e., determine y(k) where $y(k) = F\{F\{F\{F\{x(n)\}\}\}\}$ **(06 Marks)**

   c. What is linear filtering? Explain how DFT is used in linear filtering. **(06 Marks)**

PART – B

5 a. A designer is having a no. of 8-point FFT chips. Show explicitly how he should interconnect three chips in order to compute a 24-point DFT. **(10 Marks)**

   b. Explain analog to analog frequency transformation. **(10 Marks)**

6 a. Determine the order of a Chebyshev digital filter that meets the following specifications:
i) 1 dB ripple in the passband $o \le |w| \le 0.3\pi$
ii) At least 60 dB attenuation in the stopband $0.35\pi \le |w| \le \pi$. **(06 Marks)**

b. Use the bilinear transformation to design a discrete time Chebyshev high pass filter with an equirriple passband with $0 \le |H(e^{jw})| \le 0.1$, $0 \le |w| \le 0.1\pi$ and $0.9 \le |H(e^{jw})| \le 1.0$, $0.3\pi \le |w| \le \pi$ **(14 Marks)**

7 a. Consider the pole zero plot, as shown in Fig.7(a).

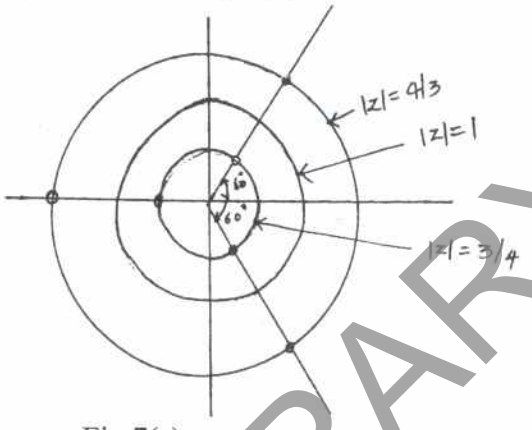

Fig.7(a)

i) Does it represent an FIR filter? ii) Is it a linear phase system? **(04 Marks)**

b. Compare FIR versus IIR. **(06 Marks)**

c. A filter is be designed with the following desired frequency response.

$$H_d(w) = \begin{cases} 0, & -\frac{\pi}{4} < w < \frac{\pi}{4} \\ e^{-j2w}, & \frac{\pi}{4} < |w| < \pi \end{cases}$$

Find the frequency response of the FIR filter designed using a rectangular window defined as $w_R(n) = \begin{cases} 1, & 0 \le n < 4 \\ 0, & \text{otherwise} \end{cases}$. **(10 Marks)**

8 a. Explain the structures used for realizing FIR filters by illustrations. **(10 Marks)**

b. Consider the causal linear shift invariant filter, with system function

$$H(z) = \frac{1 + 0.875z^{-1}}{(1 + 0.2z^{-1} + 0.9z^{-2})(1 - 0.7z^{-1})}$$

Draw a signal flow graph for this system using
i) Direct form-I
ii) Direct form-II
iii) A cascade of first and second order systems realized in direct form-II
iv) A cascade of first and second-order systems realized in transposed direct form-II.
(10 Marks)

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06EC53

Fifth Semester B.E. Degree Examination, Dec.09/Jan.10
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. Explain the following:
   i) Functions of a random variable
   ii) Moments about the origin
   iii) Autocorrelation function. **(09 Marks)**

b. A random variable x has the density:

$$f_x(x) = \begin{cases} (3/32)(-x^2 + 8x - 12); & 2 \le x \le 6 \\ 0; & \text{elsewhere} \end{cases}$$

Find the moments m_0, m_1, m_2 and μ_2. **(06 Marks)**

c. List the properties of Gaussian process. **(05 Marks)**

2 a. Describe generation techniques of AM wave. **(10 Marks)**

b. An amplitude modulated signal is given by
$S(t) = [10\cos(2\pi\times10^6 t) + 5\cos(2\pi\times10^6 t)\cos(2\pi\times10^3 t) + 2\cos(2\pi\times10^6 t)\cos(4\pi\times10^3 t)]$ volts.
Find the i) total modulated power, ii) sideband power and iii) net modulation index. **(06 Marks)**

c. Discuss the drawbacks of envelope detector. **(04 Marks)**

3 a. Explain the generation of DSB-SC using ring modulator. **(08 Marks)**

b. Consider a resultant wave obtained by adding a non-coherent carrier $A_c\cos\{2\pi f_c t + \phi\}$ to a DSB-SC, wave, $\cos 2\pi f_c t \cdot m(t)$. This composite wave is applied to an ideal envelope detector. Find the resulting detector output. Evaluate this output for $\phi = 0$. **(08 Marks)**

c. List the properties of Hilbert transformer. **(04 Marks)**

4 a. Explain the concept of quadrature multiplexing. **(06 Marks)**

b. Describe the phase discrimination method of generating SSB waves. **(07 Marks)**

c. Explain coherent detection of VSB-SC waves. **(07 Marks)**

PART – B

5 a. Explain the direct method of generating FM waves. **(08 Marks)**

b. Derive time-domain expression for a wideband FM wave. **(08 Marks)**

c. A sinusoidal modulating waveform of amplitude 10V and a frequency of 1 kHz is applied to an FM generator that has a frequency sensitivity constant of 40 Hz/Volt. Determine the i) frequency deviation and ii) modulation index. **(04 Marks)**

6 a. With relevant analysis, explain the FM demodulation, using PLL. **(10 Marks)**

b. The noise figure of the individual stages of a two stage amplifier is 2.03 and 1.54 respectively. The available power gain of the first stage is 62. Evaluate the overall noise figure. Derive the relation used. **(10 Marks)**

7 a. Derive an expression for FOM of FM receiver. **(10 Marks)**

b. The PSD of noise at the front-end of the receiver is 0.5×10^{-3} Watts/Hz. The modulating wave m(t) is sinusoidal, with a carrier power of 80 kW and a sideband power of 10 kW per sideband. The message bandwidth is 5 kHz. Assume the use of an envelope detector in the receiver, determine o/p SNR of the system. Derive the relation used. **(10 Marks)**

8 Write short notes on :

a. Pre-emphasis and de-emphasis in FM

b. Equivalent noise temperature

c. Thermal noise

d. FM stereo multiplexing. **(20 Marks)**

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06EC54

Fifth Semester B.E. Degree Examination, Dec.09/Jan.10
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. Missing data may be suitably assumed.
3. Smith chart may be provided.

PART – A

1 a. Derive the equation for the following at microwave frequency.
   i) Propagation constant
   ii) Attenuation constant
   iii) Phase constant
   iv) Characteristic impedance
   v) Phase velocity. **(12 Marks)**

b. Derive the relationship between SWR and reflection co-efficient. **(03 Marks)**

c. The characteristic impedance of the line is 50 Ω and SWR ρ = 2 when the line is loaded. When the line is shorted, the minima shifts 0.15 λ towards load. Determine the load impedance. Use Smith chart. **(05 Marks)**

2 a. Give the comparison between waveguide and co-axial cable. **(06 Marks)**

b. An air filled rectangular waveguide of inside dimension a = 7 cms and b = 3.5 cm operates in the dominant TE_{10} mode.
   i) Find the cut-off frequency.
   ii) Determine phase velocity of the wave in the guide at a frequency of 3.5 GHz.
   iii) Determine the guide wavelength at the same frequency. **(06 Marks)**

c. How to realize the four-port circulator with directional couplers and phase shifter? Explain. **(08 Marks)**

3 a. Explain with relevant figures the fundamental concept of RWH theory. **(05 Marks)**

b. A typical h-type GaAS Gunndiode has the following parameters:
   Threshold field = E_{th} = 2800 v/cm
   Applied field = E = 3200 v/cm
   Device length = L = 10 μm
   Doping concentration = $n_0 = 2 \times 10^{14}$ cm^{-3}
   Operating frequency = f = 10 GHz.
   i) Compute electron drift velocity
   ii) Calculate the current density
   iii) Estimate the negative electron mobility. **(04 Marks)**

c. Explain the principle of operation of read diode with suitable diagrams. **(06 Marks)**

d. Draw the equivalent circuit for parametric amplifier and explain. **(05 Marks)**

4 a. Explain the relation between incident and reflected waves in terms of scattering parameters for a two port network. Also explain physical significance of s-parameters. **(08 Marks)**

b. Which properties are common in S, Z and Y matrices? **(03 Marks)**

c. Two transmission lines of characteristic impedances Z_1 and Z_2 are joined at plane PP′. Express s – parameters in terms of impedances. **(09 Marks)**

PART – B

5 a. Explain with a neat sketch a precision rotary phase shifter. **(06 Marks)**

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

c. With a neat sketch explain the different types of strip lines. **(08 Marks)**

6 a. Briefly explain the characteristics of micro strip line. **(04 Marks)**

b. A lossless parallel strip line has a conducting strip width W. The substrate dielectric separating the two conducting strips has a relative dielectric constant $\in rd$ of 6 and a thickness d of 4 mm. Evaluate w, c and u_p (in usual notations). **(08 Marks)**

c. Define the following related to radar system:
   i) Pulse repetition frequency
   ii) Rest time
   iii) Duty cycle
   iv) Maximum unambiguous range. **(08 Marks)**

7 a. A radar operating at 3 GHz is radiating power of 200 kw. Calculate the power of the reflected signal at the radar with a 20 m^2 target at 5.556 km. Given $A_e = 9m^2$. Also derive the necessary formula. **(12 Marks)**

b. Draw the block diagram of a MTI radar that uses a power amplifier as the transmitter. Explain the function of each block. **(08 Marks)**

8 Briefly explain the following with reference to radar.

a. Blind speed. **(04 Marks)**

b. MTI improvement factor. **(04 Marks)**

c. 3-pulse cancellers. **(06 Marks)**

d. Recursive filters. **(06 Marks)**

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06EC55

Fifth Semester B.E. Degree Examination, Dec.09/Jan.10
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. Assume missing data suitably.

PART – A

1 a. Briefly explain the different network structures used in communication. **(08 Marks)**

b. Explain the principle of operation of four wire circuits, with the help of a neat diagram. **(08 Marks)**

c. Give the need for standards. **(04 Marks)**

2 a. Define: i) Traffic ; ii) Congestion ; iii) Lost call systems. **(06 Marks)**

b. During the busy hour, on average, a customer with a single telephone line makes three calls, and receives three calls. The average call duration is two minutes. What is the probability that a caller will find the line engaged? **(04 Marks)**

c. Derive an expression for second Erlong distribution from the basic principles. **(10 Marks)**

3 a. List the functions of switching systems. **(08 Marks)**

b. With a neat diagram, explain basic call processing of incoming and outgoing calls through digital switching systems. **(09 Marks)**

c. Define the different facilities provided by electronic switching. **(03 Marks)**

4 a. What is grading? Explain any two types of gradings. **(06 Marks)**

b. Derive an expression for grade of service of a three stage network. **(08 Marks)**

c. Derive a three stage network for connecting 100 incoming trunks to 100 outgoing trunks. **(06 Marks)**

PART – B

5 a. Explain space switch with the help of a neat diagram. **(08 Marks)**

b. An STS network has 16 incoming and 16 outgoing highways, each of which conveys 24 PCM channels. Between the incoming and outgoing space switches, there are 20 links containing time switches. During busy hour, the network is offered 300 Erlangs of traffic. Estimate grade of service if:
i) Connection is required to a particular free channel on a selected outgoing highway.
ii) Connection is required to a particular outgoing highway, but any free channel on it may be used. **(08 Marks)**

c. Explain the need for frame alignment in time division switching network. **(04 Marks)**

6 a. List the call features. **(05 Marks)**

b. Briefly explain the basic call model. **(06 Marks)**

c. Explain the three modes of operation for call forwarding using simple flow diagrams. **(09 Marks)**

7 a. Explain the organizational interfaces of a typical DSS central office. **(10 Marks)**

b. What is system outage impact on digital switching system? **(04 Marks)**

c. Write a brief note on defect analysis. **(06 Marks)**

8 a. Explain generic switch hardware architecture with a neat diagram. **(09 Marks)**

b. Explain the three level scheme of recovery strategy in a digital switch. **(06 Marks)**

c. List the basic steps necessary to complete a simple call. **(05 Marks)**

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06EC56

Fifth Semester B.E. Degree Examination, Dec.09/Jan.10
Fundamentals of CMOS VLSI

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Distinguish between enhancement and depletion mode operation of MOSFETs. **(05 Marks)**

b. Explain with diagrams, the main steps in the twin-tub process. **(10 Marks)**

c. Compare CMOS and Bipolar technologies. **(05 Marks)**

2 a. List the expression for threshold voltage of an nMOS transistor and narrate the significance of each term in this equation. **(08 Marks)**

b. Calculate the threshold voltage with $\epsilon_{si} = 11.7 \epsilon$ $\epsilon_{ox} = 3.9 \epsilon$ for an nMOS transistor with $N_A = 2 \times 10^{17}/cm^3$, $t_{ox} = 190^oA$. Assume $\phi_{ms} = -0.85v$, $Q_{fc} = 0$, $N_i = 1.45 \times 10^{10}/cm^3$. **(07 Marks)**

c. Discuss the effect of channel length modulation on the performance of an nMOS transistor. **(05 Marks)**

3 a. List the color, stick encoding, mask layout encoding and CIF layers for the following layers used n VLSI technology :
i) n – diffusion ii) Poly silicon iii) Metal 1 iv) Impact **(04 Marks)**

b. Write the stick diagram for a parity generator using nMOS logic. **(08 Marks)**

c. Write the layout for the logic expression $Y = A + BC$ using CMOS design. **(08 Marks)**

4 a. Discuss the limits of scaling on : i) Supply voltage due to noise ii) Sub threshold current iii) Interconnects. **(10 Marks)**

b. Realize a 2-input NAND gate for a clocked CMOS logic and also for CMOS domino logic. **(10 Marks)**

PART – B

5 a. Calculate the area capacitance of a multi layer structure shown in Fig.Q5(a). **(08 Marks)**

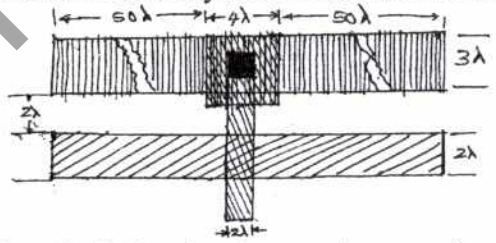

Fig.Q5(a)

b. Narrate the steps involved in calculating the sheet resistance of :
i) Transistor channels ii) nMOS inverter iii) CMOS inverter **(06 Marks)**

c. Derive expressions for rise time and fall time for 1:1 CMOS inverter. **(06 Marks)**

6 a. Discuss the architectural issues to be followed in the design of a VLSI subsystem. **(06 Marks)**

b. Design 4:1 MUX using transmission gates. **(06 Marks)**

c. Discuss the timing constraints for both flip flops and latches. **(08 Marks)**

7 a. Discuss Baugh-Worley method used for Two's complement multiplication. **(12 Marks)**

b. Explain the working of 3TDRAM cell. **(08 Marks)**

8 a. Define noise margin for both high and low levels. **(04 Marks)**

b. Discuss the meaning of "REAL ESTATE" in VLSI design. **(08 Marks)**

c. Narrate the meaning of controllability and observability in VLSI chip testing. **(08 Marks)**

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