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06AL51

Fifth Semester B.E. Degree Examination, June/July 2011
Management and Entrepreneurship

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. According to Mintzberg, what are the different roles of a manager when he occupy different positions in different situations. Explain in brief. **(10 Marks)**

b. Using characteristic of profession as given by McFarland, discuss whether management a profession. **(05 Marks)**

c. List and discuss various contributions F.W, Taylor made in development of management thought. **(05 Marks)**

2 a. What is planning? Discuss importance of planning. **(05 Marks)**

b. What is rational decision? Explain the steps involved in it. **(07 Marks)**

c. What is the principle of navigational change? Basing this during planning, explain the areas where built in flexibility need to be considered and what would then mean? **(08 Marks)**

3 a. State and explain principles of organization. **(10 Marks)**

b. What is span of management? What factors govern the span of management? **(05 Marks)**

c. Describe matrix organization. **(05 Marks)**

4 a. What is co-ordination? What are the techniques of achieving effective co-ordination? **(08 Marks)**

b. What is motivation? Explain Maslow's need hierarchy theory of motivation. **(07 Marks)**

c. Explain principle of effective communication. **(05 Marks)**

PART – B

5 a. List classification and types of entrepreneurs. **(10 Marks)**

b. List and explain entrepreneurial functions. **(05 Marks)**

c. List barriers to entrepreneurship as identified by Karl H Vespar. **(05 Marks)**

6 a. Describe steps for starting a small industry. **(10 Marks)**

b. What is small scale industrial unit? What is the importance of SSI? **(05 Marks)**

c. Explain the impact of globalization on small scale industries. **(05 Marks)**

7 a. What is prime minister's Rozger Yojana (PMRY)? What are its salient features? **(03 Marks)**

b. What are various activities of TECSOK (Technical Consultancy Services Organisation of Karnataka)? **(07 Marks)**

c. What roles government is playing to promote and growth of SSI? Name certain institutions organized to support this cause. **(10 Marks)**

8 a. What is project report? What is the importance of it? **(05 Marks)**

b. What do you mean by project feasibility? Discuss about economic feasibility. **(05 Marks)**

c. What factors on which a project report is generally prepared? Explain. **(10 Marks)**

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06EC52

Fifth Semester B.E. Degree Examination, June/July 2011
Digital Signal Processing

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Prove that the sampling of Fourier transform of a sequence x(n) results in N point DFT using which both the sequence and the transform can be reconstructed. **(10 Marks)**

b. Derive the relationship between N point DFT and Z transform. **(04 Marks)**

c. Evaluate the following function without computing the DFT: $\sum_{k=0}^{11} e^{\frac{-j4\pi k}{6}} x(k)$ for a given 12 point sequence x(n) = [8, 4, 7, -1, 2, 0, -2, -4, -5, 1, 4, 3]. **(06 Marks)**

2 a. Let x(n) be a length 'N real sequence with N point DFT X(k). Prove that :
i) X (N – k) = X*(k) and ii) X(0) is real. **(06 Marks)**

b. P.T $\sum_{n=0}^{N-1} x(n)y^*(n) = \frac{1}{N}\sum_{k=0}^{N-1} x(k)y^*(k)$. **(06 Marks)**

c. Determine the N point circular correlation of $x_1(n)$ and $x_2(n)$ defined by
$x_1(n) = \text{Cos}\frac{2\pi n}{N}$ $x_2(n) = \text{Sin}\frac{2\pi n}{N}$. **(08 Marks)**

3 a. Using DFT properties which relates linear convolution to circular convolution, obtain the output of a linear filter given the impulse response h(n) = [1, 1, 1] and an input to be a long sequence x(n) = [1, 2, 0, -3, 4, 2, -1, 1, -2, 3, 2, 1, -3]. **(09 Marks)**

b. Find the 4 point DFT of e real sequences using single 4 point DFT. Given :
g(n) = [1, 2, 0, 1] and h(n) = [2, 2, 1, 1]. **(09 Marks)**

c. How many multiplications and additions are needed for 64 point sequence in calculation of DFT using FFT algorithm and using direct DFT computation? Also specify number of real registers needed to perform these computations. **(02 Marks)**

4 a. Derive the radix – 2 DIT FFT algorithm to compute DFT of an N = 8 point sequence and draw the complete signal flow graph. **(07 Marks)**

b. Using DIT FFT find the sequence x(n) corresponding to 8 point DFT, where x(k) is given by x(k) = [4, 1-j 2.414, 0, 1-j 0.414, 0, 1 + j 0.414, 0, 1+j 2.414]. **(08 Marks)**

c. Derive the impulse response and hence the transfer functions for Goertzel filter and realize the same in DF – II. **(05 Marks)**

PART – B

5 a. Derive the expression for poles from the squared magnitude response of Butterworth L.P.F. **(06 Marks)**

b. Transform the third order Butterworth normalized low pass filter to high pass filter with passband edge at 2 rad/sec. (Transfer function can be directly written). **(07 Marks)**

c. Derive an expression for the order of Chebyshev type 1 low pass filter. **(07 Marks)**

6 a. Derive the frequency response of a symmetric FIR low pass filter for both N even and Nodd. **(08 Marks)**

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

$H_d(e^{jw}) = H_d(w) = e^{-j2w}$ .....$|w| < \pi/4$

$= 0$ .....$\pi/4 \le w \le \pi$

Determine the filter coefficients h(n), given rectangular window w(n) defined by

$w(n) = 1 \quad 0 \le n \le 4$

$= 0$ Otherwise. **(07 Marks)**

c. Explain the frequency sampling design of FIR filters and realize it in DF structure. **(05 Marks)**

7 a. Derive the transformation of IIR filter using approximation of derivatives by backward difference and verify whether it satisfies the sufficient and necessary conditions of mapping. **(06 Marks)**

b. Convert the following transfer function into digital using impulse invariance method :

$H(s) = \dfrac{s+a}{(s+a)^2 + b^2}$. **(05 Marks)**

c. Design a digital Butterworth filter H(z) given an equivalent analog filter with following specifications : passband ripple ≤ 3db, stopband edge frequency of 750 hz, stop band attenuation of 15 db, passband edge frequency = 500 hz and sampling rate is 2 kHz. Design using bilinear transformation. **(09 Marks)**

8 a. Obtain a DF – II and cascade realization for the system function :

$H(z) = \dfrac{(1+z^{-1})}{(1-1/4\,z^{-1})\left(1-z^{-1}+\frac{1}{2}z^{-2}\right)}$. **(06 Marks)**

b. Obtain linear phase realization of the impulse response using ladder structure symmetric structure : $h(n) = \delta(n) - \frac{1}{4}\delta(n-1) + \frac{1}{2}\delta(n-2) + \frac{1}{2}\delta(n-3) - \frac{1}{4}\delta(n-3) + \delta(n-5)$. **(06 Marks)**

c. Determine the coefficients k_m of lattice filter whose transfer function corresponding to FIR filter described by the transfer function $H(z) = 1 + 2z^{-1} + \frac{1}{3}z^{-2}$. Also draw the corresponding II order lattice structure. **(08 Marks)**

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06EC53

Fifth Semester B.E. Degree Examination, June/July 2011

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 following terms and find the relation between them :
   i) Joint probability of events A and B
   ii) Conditional probability of events A and B **(06 Marks)**

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

c. A white noise w(t), whose PSD is $\eta/2$, is passed through an n^{th} order Butterworth low pass filter. Determine on expression for the noise equivalent band width of this filter.
   i) What is the limiting value of the noise equivalent bandwidth as $n \to \infty$?
   ii) What is the output noise power if n = 1 if $\eta/2 = 10^{-12}$ volts^2/Hz, (noise power spectral density) f_o = 4 KHz (cut off frequency of the filter)? **(08 Marks)**

2 a. Explain the generation of AM wave using switching modulator with equivalent equation, waveform and spectrum before and after filtering process. **(10 Marks)**

b. Show that a square low device can be used to detect AM wave. **(06 Marks)**

c. Find the ratio of maximum average power to unmodulated cosine power in AM wave. **(04 Marks)**

3 a. Explain the generation of DSBSC wave using ring modulator. **(08 Marks)**

b. What is quadrature rule effect? How it can be eliminated? **(06 Marks)**

c. With a neat diagram explain quadrature carrier multiplexing. **(06 Marks)**

4 a. Explain the generation of SSB wave using phase discrimination method with the help of a neat functional block diagram. Bringout merits and demerits of this modulation scheme. **(08 Marks)**

b. Explain the generation of VSB wave. **(06 Marks)**

c. Describe AM radio **(06 Marks)**

PART – B

5 a. Briefly explain and justify the following with reference to frequency modulation:
   i) Bandwidth
   ii) Modulation index
   iii) NBFM and WBFM. **(10 Marks)**

b. Derive an expression for the spectrum of FM wave with sinusoidal modulating signal. **(10 Marks)**

6 a. Explain FM generation using direct method. **(07 Marks)**

b. Explain with a suitable functional diagram the generation of WBFM starting from NBFM with relevant equation (no need for derivations). **(08 Marks)**

c. Explain FM detection using PLL. **(05 Marks)**

7 a. A modulating signal $5\cos 2\pi 15 \times 10^3 t$, angle modulates a carrier $A\cos w_c t$. Find the modulation index and bandwidth for FM system. Determine the change in the bandwidth and modulation index if FM is reduced to 5 KHz. **(12 Marks)**

b. Determine the noise equation bandwidth for a RC low pass filter shown in Fig.Q7(b).

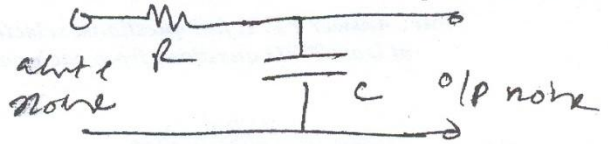

Fig.Q7(b) **(08 Marks)**

8 a. Define noise figure and explain its significance. **(07 Marks)**

b. Find the expression for figure of merit for DSBSC receiver. **(13 Marks)**

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06EC54

Fifth Semester B.E. Degree Examination, June/July 2011
Microwaves and Radar

Time: 3 hrs. Max. Marks:100

Note: 1. ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***
2. Smith chart may be provided.

PART - A

1 a. Derive an expression for the line impedance of a transmission line, at the sending end, in terms of load impedance (z_ℓ) and characteristics impedance (z_o). **(08 Marks)**

b. Derive the relationship between standing wave ratio (s) and reflection coefficient (r). **(06 Marks)**

c. A load impedance of 73 – j80 ohm is required to be matched to a 50 ohm coaxial line having operating wavelength λ = 30cm, using a short circuited shunt stub. Determine the position and length of the stub. **(06 Marks)**

2 a. Derive electric and magnetic field equations in rectangular waveguides for TM_{mn} mode. **(07 Marks)**

b. With neat diagram, explain construction of a two – hole directional coupler. Derive S – matrix of the coupler. **(07 Marks)**

c. Explain the phenomenon of the gyromagnetic resonance of the ferrite. What is the condition to obtain a differential phase shift of 90^0 for the two directions of wave propagation through the ferrite slab? **(06 Marks)**

3 a. Explain the fundamental concept of the Ridley Watkins – Hilsum (RWH) theory. Derive an expression for the condition for negative resistance in the Gunn diode, with the help of two – vally model. **(08 Marks)**

b. State the two effects by which IMPATT diodes exhibit a differential negative resistance. **(02 Marks)**

c. Draw equivalent circuit of the parametric amplifier. Explain briefly parametric up converter. **(06 Marks)**

d. The drift velocity of electrons is 2×10^7 cm/s, through the active region of length 10×10^{-4} cm. Calculate the natural frequency of the diode and the critical voltage. (Critical field of G_aA_s = 3.2 kV/cm). **(04 Marks)**

4 a. Define the following losses in a microwave network in terms of S – parameters : **(06 Marks)**
i) Insertion loss ii) Transmission loss iii) Reflection loss iv) Return loss.

b. State and derive properties of S – parameters. **(08 Marks)**

c. Derive an expression of the input reflection coefficient of a two port network with mismatched load. **(06 Marks)**

PART - B

5 a. Explain construction and working of a precision rotary type phase shifter, with neat diagram. **(08 Marks)**

b. With neat diagram, explain construction of precision type variable attenuator. **(06 Marks)**

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

6 a. With necessary equations, explain various lossess in microstrip lines. **(08 Marks)**

b. Explain construction of a parallel strip lines, with a neat schematic diagram. State equations of distributed parameters of this line. **(06 Marks)**

c. A shielded strip line has the following parameters :
Dielectric constant of insulator (polystyrene) $\varepsilon_r = 2.56$; Strip width W = 25 mils ;
Strip thickness t = 14 mils ; Shield depth d = 70 mils. Calculate i) The K factor
ii) The fringe capacitance iii) The characteristics impedance of the line. **(06 Marks)**

7 a. Define following terms related to RADAR :
i) Range to a RADAR ii) Maximum unambiguous range. **(04 Marks)**

b. Derive an expression for the simple form of the maximum range of the radar. Comment on the radar range equation. **(08 Marks)**

c. A 10GHz RADAR has the following characteristics :
Peak transmitted power = $P_t = 250$ KW ; Power gain of antenna = G = 2500 ;
Minimum detectable peak signal power by the receiver = $S_{min} = 10^{-14}$W.
Radar cross section of the target = $6 = 2m^2$;
Cross – sectional area of the radar antenna = $A_e = 10m^2$.
Find the maximum range (R_{max}) possible. **(03 Marks)**

d. State and briefly explain applications of RADAR. **(05 Marks)**

8 a. With neat block diagram, explain working principle of continuous wave (CW) RADAR. Explain how sign of Doppler frequency is determined. **(07 Marks)**

b. Explain single delay line canceler with neat block diagram. Derive an expression for the frequency response of a single delay line canceler. **(07 Marks)**

c. A 3.25cm pulse Doppler RADAR has a pulse repetition frequency of 4000 PPS. Find
i) the maximum unambiguous range ii) maximum Doppler frequency shift and
iii) maximum radial velocity of the target. **(06 Marks)**

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06EC55

Fifth Semester B.E. Degree Examination, June/July 2011
Digital Switching Systems

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Explain in brief the operation of a four-wire circuit in two-way transmission system. **(08 Marks)**

b. Express the following power levels in dBm and dBW:
i) 1 mW ii) 1 W iii) 2 mW iv) 100 mW. **(04 Marks)**

c. Calculate the total bit rate for a 30-channel PCM system and draw figure for the same with all details included. Also show calculation for length of the frame. **(08 Marks)**

2 a. Bring out the differences between circuit switching and message switching. **(06 Marks)**

b. Mention the functions of a switching system. **(06 Marks)**

c. With neat block diagram, explain subscriber's line interface circuit for a digital exchange. **(08 Marks)**

3 a. Define the following :
i) Busy hour ii) Grade of service iii) Holding time iv) Statistical equilibrium. **(08 Marks)**

b. Derive an expression for grade of service of a lost-call system having N trunks. **(06 Marks)**

c. A group of five trunks is offered 2E of traffic. Find
i) The grade of service
ii) The probability that only one trunk is busy.
iii) The probability that only one trunk is free.
iv) The probability that at least one trunk is free. **(06 Marks)**

4 a. Design a grading for connecting 20 trunks to switches having ten outlets. **(08 Marks)**

b. Derive an expression for minimum number of crosspoints considering two stage network with M incoming trunks and N outgoing trunks. **(12 Marks)**

PART – B

5 a. With neat sketch, explain space switch and time switch. **(12 Marks)**

b. An S-T-S 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 the busy hour, the network is offered 300 E. Estimate the 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)**

6 a. Explain in brief basic software architecture used in digital switching system. **(12 Marks)**

b. With flow diagram, discuss call forwarding feature. **(08 Marks)**

7 a. Explain in brief system outage and its impact on DSS reliability. **(06 Marks)**

b. What is the scheme that a digital switching environment follows for the internal and external reporting of faults? Discuss. **(08 Marks)**

c. Explain in brief a strategy for improving software quality. **(06 Marks)**

8 a. Draw flowchart for a typical call through a typical digital switching system. **(06 Marks)**

b. Explain in brief generic switch hardware architecture. **(06 Marks)**

c. Write short notes on: i) Skipped grading ii) Reliability analysis. **(08 Marks)**

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06EC56

Fifth Semester B.E. Degree Examination, June/July 2011
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. Describe in detail step-by-step procedure of P-well CMOS fabrication. **(08 Marks)**

b. Explain the transfer plot of CMOS inverter with necessary expression for V_{out} in each region. **(08 Marks)**

c. Write a note on transmission gate. **(04 Marks)**

2 a. Draw circuit diagram and stick diagrams of two input NOR gate using CMOS logic use standard colour/monochrome codes. **(08 Marks)**

b. Explain λ based design rules applicable to MOS layers and transistors. **(08 Marks)**

c. Write a note on Double metal MOS process rules for contact cut. **(04 Marks)**

3 Explain the following logic structures with their salient features:

a. BiCMOS logic b. Pseudo-nMOS logic c. Pass transistor logic d. C^2MOS logic. **(20 Marks)**

4 a. Define sheet resistance, standard unit of capacitance and delay unit of time. **(06 Marks)**

b. Explain cascaded inverters to drive large capacitive loads. Obtain an equation to find number of stages. **(08 Marks)**

c. Discuss the following in scaling of MOS circuits:

i) Limit of miniaturization ii) Limits of interconnect and contact resistance. **(06 Marks)**

PART – B

5 a. Explain the structured design of a parity generator with necessary blocks and stick diagram. **(10 Marks)**

b. Explain domino CMOS logic with neat circuit. **(10 Marks)**

6 a. List and explain the general considerations to be considered in Digital system design. **(06 Marks)**

b. Explain the design of datapath in 4-bit arithmetic processor with floor plan for 4-bit datapath. **(10 Marks)**

c. Write MOS switch implementation of 4×4 crossbar switch. **(04 Marks)**

7 a. What are timing considerations in system design? **(06 Marks)**

b. Draw one-transistor dynamic memory cell circuit arrangement. What is the significance of creating capacitor by using a polysilicon plate over the diffusion area? **(08 Marks)**

c. Explain six transistor static CMOS memory cell arrangement. **(06 Marks)**

8 a. Discuss the requirements of I/O pads in a chip. **(05 Marks)**

b. Explain the sensitized path based testing applied to combinational logic as an example. **(10 Marks)**

c. Write a note on scan design technique. **(05 Marks)**

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