USN | | | | | | | | | | |  **10AL51**

# Fifth Semester B.E. Degree Examination, June/July 2016
# Management and Entrepreneurship

Time: 3 hrs. Max. Marks:100

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

## PART – A

1 a. Define management, explain the levels of management. **(10 Marks)**
b. Define planning. Explain the types of plans with example. **(10 Marks)**

2 a. Explain in details any five functions of management. **(10 Marks)**
b. List and explain the characteristics of planning. **(10 Marks)**

3 a. Discuss the steps commonly followed by organizations in selection procedure. **(10 Marks)**
b. Discuss the different sources of recruitment. **(10 Marks)**

4 a. What are the purposes of communications in an organization? **(10 Marks)**
b. Discuss all the steps involved in a control process. **(10 Marks)**

## PART – B

5 a. Define entrepreneur. Discuss four key elements in context to entrepreneurship. **(06 Marks)**
b. Explain entrepreneurs based on the type of business. **(08 Marks)**
c. Discuss three barriers in connection with entrepreneurship. **(06 Marks)**

6 a. Discuss steps in the location of small scale industry. **(10 Marks)**
b. Explain the important factors in the selection of a small scale industry site. **(10 Marks)**

7 a. Discuss in detail on sources of finance for small scale industry. **(10 Marks)**
b. Elaborate on objectives and functions of SIDBI. **(10 Marks)**

8 a. Define project, discuss at least four criteria to select a project. **(10 Marks)**
b. What are the needs of network techniques in project? Explain two types of network techniques in project implementation. **(10 Marks)**

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
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**10EC52**

# Fifth Semester B.E. Degree Examination, June/July 2016
## Digital Signal Processing

Time: 3 hrs. Max. Marks:100

**Note:** ***1. Answer any FIVE full questions, selecting atleast TWO questions from each part.***
***2. Use of prototype filter tables is not permitted.***





### PART – A

1 a. Find the N – point DFT of $x(n) = a^n$ for $0 < a < 1$. **(04 Marks)**

b. A discrete time LTI system has impulse response $h(n) = 2\delta(n) - \delta(n-1)$. Determine the output of the system if the input $x(n) = \{\delta(n) + 3\delta(n-1) + 2\delta(n-2) - \delta(n-3) + \delta(n-4)\}$ using circular convolution. **(06 Marks)**

c. Determine 8 – point DFT of the signal $x(n) = \{1, 1, 1, 1, 1, 1, 0, 0\}$. Also sketch its magnitude and phase. **(10 Marks)**

2 a. g(n) and h(n) are the two sequences of length 6 with 6 – point DFT's G(k) and H(k) respectively. The sequence $g(n) = \{4, 3, 1, 5, 2, 6\}$. The DFT's are related by circular frequency shift as $H(k) = G((k-3))_6$. Determine h(n) without computing DFT and IDFT. **(07 Marks)**

b. Given $x(n) = \{1, 2, 3, 4\}$ and $h(n) = \{1, 2, 2\}$ compute i) circular convolution ii) linear convolution iii) linear convolution using circular convolution. **(08 Marks)**

c. Prove Parseval's relation as applied to DFT. **(05 Marks)**

3 a. Explain with necessary diagrams and equations the concept of overlap – save method for linear filtering. **(10 Marks)**

b. Write a note on Goertzel algorithm. **(05 Marks)**

c. What is in–place computation? What is the total number of complex additions and multiplications required for N = 64 point, if DFT is computed directly and if FFT is used? Also find the number of stages required and its memory requirement. **(05 Marks)**

4 a. First five points of the 8 – point DFT of a real valued sequence is given by $x(0) = 0$, $x(1) = 2 + 2j$, $x(2) = -4j$, $x(3) = 2 - 2j$, $x(4) = 0$. Determine the remaining points. Hence find the original sequence x(n) using DIT – FFT algorithm. **(10 Marks)**

b. Find the 4 – pt circular convolution of $x(n) = \{1, 1, 1, 1\}$ and $h(n) = \{1, 0, 1, 0\}$ using radix 2 DIF – FFT algorithm. **(10 Marks)**

### PART – B

5 a. Design an analog Chebyshev filter with the following specifications :
Passband ripple : 1 dB for $0 \le \Omega \le 10$ rad/sec
Stopband attenuation : –60 dB for $\Omega \ge 50$ rad/sec. **(12 Marks)**

b. Derive the expressions of order and cutoff frequency of a analog butter worth filter. **(08 Marks)**

6 a. Realize the following difference equation using digital structures in all the forms :
$y(n) - \frac{3}{4}y(n-1) + \frac{1}{8}y(n-2) = x(n) + \frac{1}{3}x(n-1)$. **(16 Marks)**

b. Realize the FIR filter whose transfer function is given by :
$$H(z) = 1 + \frac{3}{4}z^{-1} + \frac{17}{8}z^{-2} + \frac{3}{4}z^{-3} + z^{-4} \text{ in direct form.}$$ **(04 Marks)**

7 a. Design a symmetric FIR low pass filter whose desired frequency response is given as :

$$H_{\alpha}(\omega) = \begin{cases} e^{-j\omega p} & \text{for } |\omega| \le \omega_c \\ 0 & \text{otherwise} \end{cases}$$

The length of the filter should be 7 and $\omega_c = 1$ rad/sample. Use rectangular window. **(10 Marks)**

b. Design a normalized linear phase FIR filter having the phase delay of $T = 4$ and atleast 40 dB attenuation in the stopband. Also obtain the magnitude /frequency response of the filter. **(10 Marks)**

8 a. Let $H_a(S) = \dfrac{b}{(s+a)^2 + b^2}$ be a causal II order analog transfer function. Show that the causal II order digital transfer $H(z)$ obtained from $H_a(s)$ through impulse invariance is given by :

$$H(z) = \frac{e^{-aT}\sin bTz^{-1}}{1 - 2e^{-aT}\omega s bTz^{-1} + e^{-2aT}z^{-2}}.$$ **(10 Marks)**

b. Design an IIR digital butterworth filter that when used in the analog to digital with digital to analog will satisfy the following equivalent specification.

i) Lowpass filter with –1 dB cutoff 100 πrad/sec
ii) Stopband attenuation of 35 dB at 1000 π rad/sec
iii) Monotonic in stopband and passband
iv) Sampling rate of 2000 rad/sec
v) Use bilinear transformation. **(10 Marks)**

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# Fifth Semester B.E. Degree Examination, June/July 2016
# Analog Communication

Time: 3 hrs. Max. Marks:100

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



## PART – A

1 a. Explain mean, correlation and covariance functions of a random process x(t). **(08 Marks)**
b. Explain the properties of auto correlation function and power spectral density. **(12 Marks)**

2 a. Define demodulation and show that a square law device can be used to detect AM waves. **(07 Marks)**
b. Explain the generation of DSB -SC wave using ring modulator. **(08 Marks)**
c. A 250 W carrier of 1000 KHz is simultaneously modulated by sinusoidal signals of 2 KHz, 6 KHz and 8 KHz with modulation indices of 35%, 55% and 75% respectively. What are the frequencies present in the modulated wave and what is the radiated power? **(05 Marks)**

3 a. With the neat diagram, explain the operation of quadrature carrier multiplexing. **(06 Marks)**
b. Describe phase discrimination method of generating SSB waves. **(06 Marks)**
c. Consider a message signal m(t) containing the frequency complents 100, 200 and 400 Hz. This message signal is applied to an SSB modulator together with a carrier at 100 KHz with only USB retained. The coherent detector employed at the receiver uses a local oscillator that gives a sine wave of frequency 100.02 KHz.
i) Determine the frequency component of the detector output
ii) Repeat your analysis assuming only LSB is transmitted. **(08 Marks)**

4 a. Derive the time domain expression of VSB modulated wave s(t) containing a vestige of upper side band. **(07 Marks)**
b. Explain the scheme for generation and demodulation of VSB waves with relevant block diagrams, and mathematical expressions. **(07 Marks)**
c. With a neat block diagram, explain the operation of AM super heterodyne receiver. **(06 Marks)**

## PART – B

5 a. Define the terms : i) modulation index ii) band width iii) frequency deviation in the case of frequency modulation. **(06 Marks)**
b. Explain the direct method of generating FM waves. **(08 Marks)**
c. An angle modulated signal is defined by $s(t) = 10 \cos[2\pi \times 10^6 t + 0.2 \sin 2000 \pi t]$ volts find the following :
i) The power in modulated signal
ii) The frequency deviation $\Delta f$
iii) Phase deviation $\Delta\theta$
iv) The approximate transmission bandwidth. **(06 Marks)**

6 a. With the help of circuit diagram, explain demodulation of FM wave using balanced frequency discriminator. **(08 Marks)**
b. With relevant block diagram, explain FM stereo multiplexing. **(06 Marks)**
c. Explain non–linearity and its effects in FM system. **(06 Marks)**

7 a. Define : shot noise, thermal noise, white noise. **(06 Marks)**

b. Define noise equivalent band width and derive the expression for the same. **(08 Marks)**

c. Two 2–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 available power gain are 15 dB and 10 dB respectively. Determine the overall noise figure in dB. **(06 Marks)**

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

b. Describe the pre – emphasis and de -emphasis in FM. **(06 Marks)**

c. An FM signal with a deviation of 75 KHz is applied to an FM demodulator. When the input SNR is 15 dB, the modulating frequency is 10 KHz, estimate the SNR at the demodulator output. **(04 Marks)**

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10EC54

# Fifth Semester B.E. Degree Examination, June/July 2016

# 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.***

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.

## PART – A

1 a. Starting from fundamental, derive the expression for the voltage and current at any point on the transmission line. **(08 Marks)**

b. A transmission line has the following primary constants R = 10.4 Ω/km, L = 0.00367 H/km, G = $0.8 \times 10^{-6}$ ℧/km, C = 0.00835 μF/km. Find α, β, γ, λ and $z_0$. **(06 Marks)**

c. Define and derive expression for reflection coefficient and transmission coefficient for a transmission line. **(06 Marks)**

2 a. A load of $Z_R = 115 - j75\Omega$ terminates at a lossless 100 Ω line. Use Smith chart to determine: (i) SWR, (ii) I/P impedance of a 0.2 λ long line, (iii) the distance from load to first voltage maximum. **(08 Marks)**

b. With neat diagram, explain Faraday's rotation isolator. **(05 Marks)**

c. With diagram, explain working of two hole direction coupler and also derive s-matrix for the same. **(07 Marks)**

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

b. An M-Si-M BARITT diode has the following parameter:
   i) Relative dielectric constant of silicon $\varepsilon_r = 11.8$
   ii) Donor concentration, $N = 2.8 \times 10^{21}/m^3$
   iii) Silicon length, L = 6 μm
   Determine the breakdown voltage and the breakdown electric field. **(05 Marks)**

c. What is Gunn effect? Explain with constructional details of a Gunn diode. **(05 Marks)**

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

b. State and explain properties of S-parameters. **(06 Marks)**

c. Two transmission lines of characteristic impedance $z_1$ and $z_2$ are joined at plane $pp^1$. Express s-parameter in terms of impedance. **(08 Marks)**

## PART – B

5 a. With neat diagram, explain the working of rotary precision phase shifter. **(10 Marks)**

b. Explain H-plane Tee junction and derive the S-matrix also. **(06 Marks)**

c. A 20 MW signal is fed into one of collinear port 1 of a lossless H-plane T-junction. Calculate power delivered through each port when other ports are terminated in matched load. **(04 Marks)**

6 a. Explain the various losses taking place in microstriplines. **(07 Marks)**
b. Explain the construction and field pattern for microstripline. **(08 Marks)**
c. Compare stripline and microstripline. **(05 Marks)**

7 a. Derive Radar range equation in terms of effective aperture, radar cross section of target and minimum detectable signal power of receivers. **(08 Marks)**
b. Discuss various application of Radar. **(06 Marks)**
c. With respect to Radar system, explain:
i) Maximum unambiguous Range
ii) Clutter attenuation
iii) Improvement factor
iv) Doppler shift **(06 Marks)**

8 a. Explain MTI Radar with neat block diagram. **(10 Marks)**
b. Write short notes on any two:
i) Delay line canceller
ii) C.W. Doppler Radar
iii) Pulsed Radar
iv) Blind speed **(10 Marks)**

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## Fifth Semester B.E. Degree Examination, June/July 2016
# Information Theory & Coding

Time: 3 hrs.                                                    Max. Marks:100

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

## PART – A

1 a. Define self information, entropy of the long independent messages, information rate, symbol rate and mutual information. **(05 Marks)**

b. The output of an information source consists of 128 symbols, 16 of which occur with a probability of $\frac{1}{32}$ and the remaining occur with a probability of $\frac{1}{224}$. The source emits 1000 symbols per second. Assuming that the symbols are chosen independently, find the average information rate of this source. **(05 Marks)**

c. For the Markov source model shown in Fig. Q1 (c):
i) Compute the state probabilities.
ii) Compute the entropy of each state.
iii) Compute the entropy of the source. **(10 Marks)**

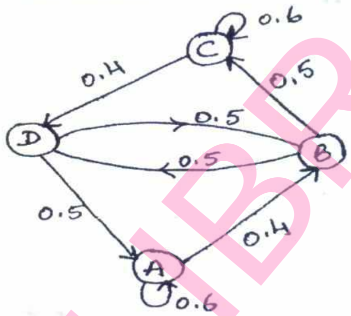


Fig. Q1 (c)

2 a. State the properties of entropy. **(04 Marks)**

b. A source emits one of the 5 symbols A, B, C, D & E with probabilities $\frac{1}{4}, \frac{1}{8}, \frac{1}{8}, \frac{3}{16}$ and $\frac{5}{16}$ respectively in an independent sequence of symbols. Using Shannon's binary encoding algorithm, find all the code words for the each symbol. Also find coding efficiency and redundancy. **(08 Marks)**

c. Construct a Shannon-Fano ternary code for the following ensemble and find code efficiency and redundancy. Also draw the corresponding code – tree.
$S = \{S_1, S_2, S_3, S_4, S_5, S_6, S_7\}$; $P = \{0.3, 0.3, 0.12, 0.12, 0.06, 0.06, 0.04\}$ with $X = \{0, 1, 2\}$ **(08 Marks)**

3 a. Show that $H(X, Y) = H(Y) + H\left(\frac{X}{Y}\right)$. **(05 Marks)**

b. The noise characteristics of a non-symmetric binary channel is given in Fig. Q3 (b). **(10 Marks)**

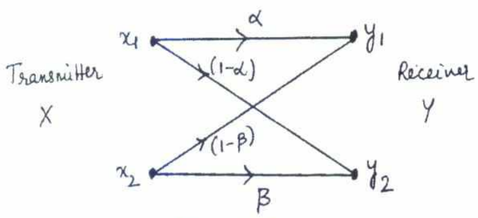


Fig. Q3 (b)

i) Find H(X), H(Y), $H\left(\frac{X}{Y}\right)$ and $H\left(\frac{Y}{X}\right)$. Given $P(x_1) = \frac{1}{4}$, $P(x_2) = \frac{3}{4}$, $\alpha = 0.75$, $\beta = 0.9$

ii) Also find the capacity of the channel with $r_s = 1000$ symbols/sec.

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.

c. A source has an alphabet consisting of seven symbols A, B, C, D, E, F & G with probabilities of $\frac{1}{4}, \frac{1}{4}, \frac{1}{8}, \frac{1}{8}, \frac{1}{8}, \frac{1}{16}$ and $\frac{1}{16}$ respectively. Construct Huffman Quarternery code. Find coding efficiency. **(05 Marks)**

4 a. State Shannon-Hartley theorem and explain its implications. **(08 Marks)**

b. A Gaussian channel has a bandwidth of 4 kHz and a two-side noise power spectral density $\frac{\eta}{2}$ of $10^{-14}$ watts/Hz. The signal power at the receiver has to be maintained at a level less than or equal to $\frac{1}{10}^{th}$ of milliwatt. Calculate the capacity of this channel. **(06 Marks)**

c. Explain the properties of mutual information. **(06 Marks)**

## PART – B

5 a. What are the types of errors and types of codes in error control coding? **(04 Marks)**

b. Consider a (6, 3) linear code whose generator matrix is, $G = \begin{bmatrix} 1 & 0 & 0 & 1 & 0 & 1 \\ 0 & 1 & 0 & 1 & 1 & 0 \\ 0 & 0 & 1 & 0 & 1 & 1 \end{bmatrix}$

i) Find all code vectors.
ii) Find all the Hamming weights.
iii) Find minimum weight parity check matrix.
iv) Draw the encoder circuit for the above codes. **(10 Marks)**

c. The parity check bits of a (7, 4) Hamming code are generated by,
$C_5 = d_1 + d_3 + d_4$; $C_6 = d_1 + d_2 + d_3$; $C_7 = d_2 + d_3 + d_4$
where $d_1$, $d_2$, $d_3$ & $d_4$ are the message bits.
i) Find generator matrix and parity check matrix.
ii) Prove that $GH^T = 0$. **(06 Marks)**

6 a. Define Binary cyclic codes. Explain the properties of cyclic codes.

b. A (15, 5) linear cyclic code has a generator polynomial,
$g(x) = 1 + x + x^2 + x^4 + x^5 + x^8 + x^{10}$ **(08 Marks)**
i) Draw the block diagram of an encoder for this code $g(x) = 1 + x + x^2 + x^4 + x^5 + x^8 + x^{10}$
ii) Find the code vector for the message polynomial $D(x) = 1 + x^2 + x^4$ in systematic form.
iii) Is $V(x) = 1 + x^4 + x^6 + x^8 + x^{14}$ a code polynomial? **(12 Marks)**

7 Write short notes on:
a. BCH codes.
b. RS codes.
c. Golay codes.
d. Brust error correcting codes. **(20 Marks)**

8 a. What are convolutional codes? Explain encoding of convolutional codes using transform domain approach. **(08 Marks)**

b. Consider the (3, 1, 2) convolutional code with $g^{(1)} = (1\ 1\ 0)$, $g^{(2)} = (1\ 0\ 1)$ and $g^{(3)} = (1\ 1\ 1)$
i) Draw the encoder block diagram.
ii) Find the generator matrix.
iii) Find the code word corresponding to the information sequence (1 1 1 0 1) using time domain approach. **(12 Marks)**

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**10EC56**

# Fifth Semester B.E. Degree Examination, June/July 2016
# Fundamentals 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. Discuss latch-up in a p-well CMOS structure and its remedies. With neat figure explain twin tub CMOS process steps. **(10 Marks)**

b. For an NMOSFET, the following details are available $\mu n = 500 cm^2/V\text{-se}$, $(V_a - V_{tn}) = 2.6V$ $t_{ox} = 100$ Å. Calculate Rn of the device if w = 100μm L = 0.5μm. **(05 Marks)**

c. Deduce an equation for figure of merit of MOS transistor. Fnd the operating frequency $f_o$ in the following condition $\mu n = 125 cm^2/v\text{-sec}$, L =2 μm, $V_{gs} = 2V$ and $\mu_{tn} = 1V$. **(05 Marks)**

2 a. What are the uses of stick diagram? Give the table of color and monochrome stick encoding for simple single metal NMOS process. **(07 Marks)**

b. Draw the CMOS circuit diagram, stick diagram and symbolic diagram of Boolean function $F = \overline{wx + yz}$. **(06 Marks)**

c. What do you mean by λ based design rule? Explain λ based design rules applicable to MOS layers and transistors. **(07 Marks)**

3 a. With neat circuit diagram explain the following : (i) A simple BiCMOS inverter and (ii) An improved BiCMOS inverter with no static current flow and better output logic levels. **(10 Marks)**

b. Draw and explain the basic structure of dynamic CMOS logic and discuss the charging sharing problem in this structure. **(10 Marks)**

4 a. What are the most commonly used scaling models? Provide scaling factors for (i) power dissipation per gate (ii) Gate delay (iii) current density and (iv) speed power product. **(10 Marks)**

b. For the given multilayer structure shown in Fig. Q4(b) calculate the total capacitance. **(10 Marks)**

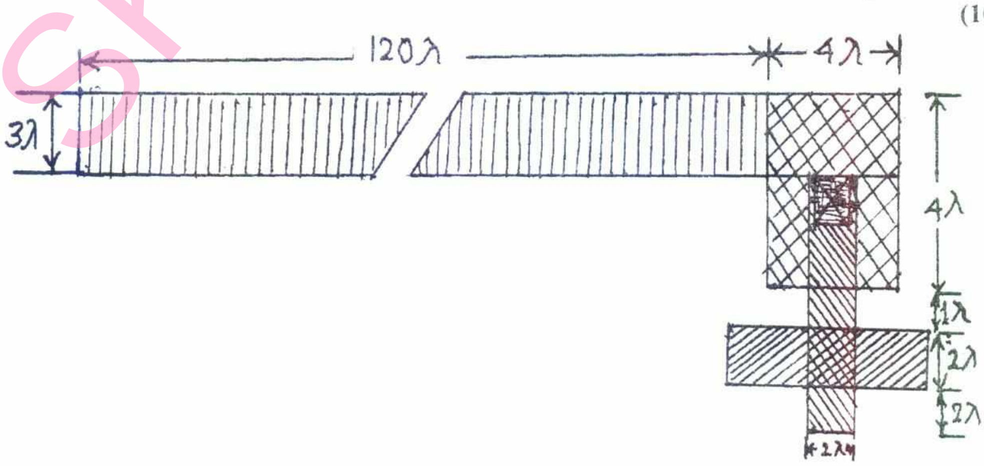


Fig. Q4(b)

## PART – B

5 a. Obtain switch logic arrangements for (i) $V_{out} = V_1A + V_2B + V_3C$ using 3 way selector switch and (ii) 3 input nMOS OR gate. **(10 Marks)**

b. Draw and explain 4 : 1 MUX using transmission gate. **(05 Marks)**

c. Explain with neat figure, non – inverting dynamic storage cells using CMOS transmission gate switch. **(05 Marks)**

6 a. With the help of logic expressions explain how to implement arithmetic logic operations with a standard adder. **(10 Marks)**

b. Explain with neat diagram the 4×4 cross bar switch. **(10 Marks)**

7 a. With neat figure explain transistor dynamic RAM cell. **(06 Marks)**

b. Describe the CMOS pseudo static memory cell with neat figure. **(06 Marks)**

c. Explain read and write operations in dynamic memory cell. **(08 Marks)**

8 Write short notes on :

a. Input/output pads **(05 Marks)**

b. Test and Testability. **(05 Marks)**

c. Level sensitive scan design and **(05 Marks)**

d. Built in self test (BIST). **(05 Marks)**

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