UNIVERSITY OF PUNE

[4363]-184

T. E. (*E & TC*) Examination - 2013

Microcontroller And Application (2008 Course)

[Total No. of Questions: *12*] **[Total No. of Printed Pages: 3]**

[Time: *3* Hours] **[Max. Marks: 100]**

Instructions:

1 *Answer any three questions from each section.*

2 *Answers to the* ***two sections*** *should be written in* ***separate answer-books****.*

3 *Neat diagrams must be drawn wherever necessary.*

4 *Black figures to the right indicate full marks.*

5 *Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*

6 *Assume suitable data, if necessary.*

SECTION –I

Q.1	A	Differentiate between microprocessor and microcontroller with general architecture and features.	8
	B	State family member and resources of 8051 series microcontroller.	8

OR

Q.2	A	Explain Harvard & van-Neumann architecture.	8
	B	Explain criteria for choosing a microcontroller.	4
	C	Explain how performance of any microcontroller is evaluated.	4
Q. 3	A	Explain different timer/counter modes of 8051.	8
	B	Explain interrupt structure in 8051 microcontroller.	8

OR

Q. 4	A	Explain PSW register of 8051 also explain the stack operation and stack pointer register of 8051 what is its	8

reset value.

	B	Write ALP for 8051 microcontroller to obtain parity (odd/even) of a given number.	5
	C	State salient features of 8051 microcontroller.	3
Q. 5	A	State and explain with the help of examples addressing modes of 8051.	10
	B	Write a program the transfer a string "Mother India" located at memory location 200H to memory location 300H.	8

OR

Q. 6	A	Explain following instructions. i) JNZ ii) PUSH iii) ACALL iv) RLC A v) CJNE	10
	B	Explain i) Logic analyzer ii) Cross Assembler iii) Emulator iv) Embedded C	8

SECTION II

Q. 7	A	Interface 8-bir ADC to 8051 microcontroller and write to generate following waveform continuously.	8

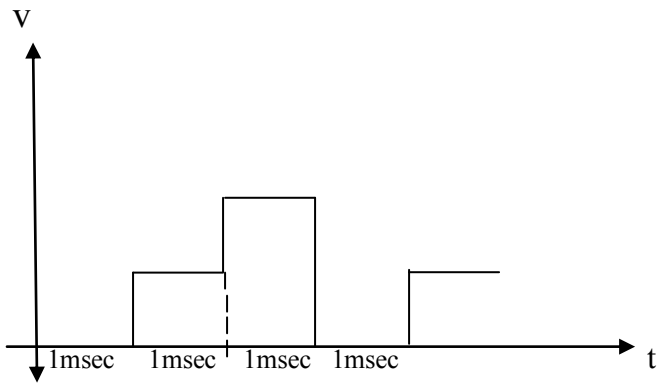

Fig.

	B	Differentiate between Rs232 & Rs485.	4
	C	Write ALP for 8051 microcontroller to blink LED's connected on part P1 after way one second using timer O interrupt. (Assume: XTAL-11.0592MHz)	4

OR

Q. 8	A	Draw interfacing diagram to interface 16×2 LCD with 8051 in 4-bit mode and write ALP to display "UNIPUNE" on first line and "BCUD" on second line.	8
	B	Write short notes on i) SPI ii) I2C	8
Q. 9	A	Draw and explain status register of PIC microcontroller.	8
	B	Write embedded C program to blink LED connected to part B of PIC.	8

OR

Q. 10	A	Describe in details memory organization of 18Fxxxx	8
	B	Explain watchdog time. Also describe rescaling.	8
Q. 11		Design a system to interface LM35 to 89C51 /PIC. Draw complete system diagram. Draw flowchart and write program the neat and display temperature on second line of 16×2 LCD display. First line of 16×2 should display "Temp".	18

OR

Q. 12		Design a test board board on 8051 microcontroller for data acquisition purpose. The board should have 4×4 keypad interface, I2C bared ADC/DAC interface, Rs232 and Rs485 interface, DS1307 interface and 16×2 LCD interface. Draw complete interfacing diagram and describe each interface.	18

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T. E. (E & TC) Examination May 2013

Digital Signal Processing

(2008 Course) (Sem-I)

Total No. of Questions : 12 **[Total No. of Printed Pages :4]**

[Time : 3 Hours] **[Max. Marks : 100]**

Instructions :

(1) Answer 3 question from section-I and 3 question from section-II

*(2) Answers to the **two sections** should be written in **separate -books**.*

(3) Neat diagram must be drawn wherever necessary.

(4) Black figures to the right indicate full marks.

(5) Your answers will be valued as whole.

(6) Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.

(7) Assume suitable data, if necessary.

SECTION-I

Q1.

a) Find the convolution of following sequences

1) $x(n) = 2^n$ and $h(n) = (1/2)^n u(n)$

2) $x(n) = n + 2$ for $0 \leq n \leq 3$ and $h(n) = a^n u(n)$ [8]

b) Define stability. Explain the condition for system to be stable in terms of impulse Response. Test the stability of the system whose impulse response is

$h(n) = (1/2)^n u(n)$

$h(n) = (3)^{-n} u(n)$ [10]

OR

Q2.

a) Determine the direct form-I and II realization for the following system. Show all Steps properly. [10]

$y(n) = -0.1y(n-1) + 0.2y(n-2) + 3x(n) + 3.6x(n-1) + 0.6x(n-2)$

$y(n) = 0.251y(n-1) + 0.05y(n-2) + x(n) - 2x(n-2)$

b) Explain the basic elements of DSP system. Explain the advantages of DSP over analog system [8]

Q3.

a) Find out the relation between DTFS and DFT. Find n=4 point DFT for $x(n) = \{1,0,1,0\}$ [8]

b) Find the circular convolution for following sequences using graphical method [8]

1) $x1(n) = \delta(n) + \delta(n-1) + \delta(n-2)$
   $x2(n) = 2\delta(n) - \delta(n-1) + 2\delta(n-2)$
2) $x1(n) = \delta(n) + \delta(n-1) - \delta(n-2) - \delta(n-3)$
   $x2(n) = \delta(n) - \delta(n-2) + \delta(n-4)$

OR

Q4.

a) Explain and prove the following properties of DFT [8]

1) Periodicity
2) Complex conjugate property of DFT
3) Time reversal
4) Circular time shifting

b) Find the DFT of a sequence x(n)={1,2,3,4,4,3,2,1} using DIT algorithm. Draw 8-point DIT FFT flow graph and slow all values properly. [8]

Q5.

a) Define ROC. Find the Z transform and sketch the corresponding ROC for following signals [8]

1) $x(n) = \{1,2,3,4,5,9\}$ (origin is at 3)
2) $x(n) = (n + 0.5)\left(\frac{1}{3}\right)^n u(n)$

b) Find the H(z) and poles of the system
$y(n) - 0.25y(n-1) + 0.25y(n-2) - 0.0625y(n-3) = 2x(n) + 3x(n-1)$
And state the system is stable or not. [8]

OR

Q6.

a) State the convolution property of Z-transform and hence find causal sequence x(n) for [8]

$X(z) = \frac{[6+z^{-1}]}{[(1+0.25z^{-1})(1+0.5z^{-1})]}$

b) Determine the inverse Z transform of the function [8]

1) $X(z) = \frac{[8z-19]}{[(z-2)(z-3)]}$ $x(n)$ is causal sequence

2) $\frac{[z^3+z^2]}{[(z-1)(z-3)]}$ ROC;|z|>3

SECTION-II

Q7.

a) Differentiate between FIR and IIR filters. In case of IIR filter, compare impulse invariant method and Bilinear Transformation method. [8]

b) Design a complete digital low pass Butterworth filter for T=1 for following specifications using an impulse invariant method [10]

$0.8 \leq |H(e^{jw})| \leq 1 \quad for \quad 0 \leq w \leq 0.2\pi$

$|h(e^{jw})| \leq 0.2 \quad for \quad 0.6\pi \leq w \leq \pi$

Q8.

a) Design the seven coefficient FIR low-pass filter using frequency sampling method with following specifications. Plot the magnitude response of the resulting filter [10]

$H(e^{jw}) = e^{-j(N-1)w/2} \quad for \quad 0 \leq |w| \leq \frac{\pi}{2}$

$H(e^{jw}) = 0 \ for \ \frac{\pi}{2} \leq |w| \leq \pi$

b) What is the nature of phase response of FIR filter? Derive the condition of linear phase of FIR filter. [8]

Q9.

a) Draw the block schematic for decimator and explain the need for a filter. Derive the expression for decimated output signal i.e. y(m) and draw the spectrum of the signal after filtering and after decimation process. [10]

b) Explain the need for multistage design. How will you select decimation factors for different stages for multistage implementation. [6]

OR

Q10.

a) Why should we use an interpolator first before a decimator in case of sampling rate converter by a factor of I/D. Derive the equation for the output of the sampling rate converter I/D [10]

b) Explain how Multi-rate sampling can be used in acquisition of high Quality data? [6]

Q11.

a) Explain the need of DSP processor and features required in DSP processor [6]

b) Explain pipelining concept. Also explain MAC, ALU and Barrel Shifter unit of DSP processor. [10]

OR

Q12.

a) Differentiate between DSP processor with conventional microprocessor architectures? Explain the architecture of TMS320C67XX listing its important features [10]

b) Explain the application of DSP processor in speech processing [6]

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T. E. (Electronics and Telecommunication)

Examination - 2013

Single Coding And

Estimation Theory

(2008 Pattern)

Total No. of Questions : 12 **[Total No. of Printed Pages :5]**

[Time : 3 Hours] **[Max. Marks : 100]**

Instructions :

(1) Answer Q.1 or Q.2,Q.3 or Q.4, Q.5 or Q.6, questions from each section I and Q.7 or Q.8, Q.9.or Q.10, Q.11 or Q. 12 question from section 2.

*(2) Answers to the **two sections** should be written in **separate answer-books**.*

(3) Neat diagrams must be drawn wherever necessary.

(4) Assume suitable data, if necessary.

SECTION-I

Q. 1. A) Show that the self information is always positive. Also calculate (9)

H(X), H(Y),H(X,Y), H(X/Y),H(Y/X and I(X;Y) for a channel with

Three inputs X_1,X_2 and X_3, Three outputs Y_1,Y_2 and $Y_3$with noise matrix as

given asP[Y/X]=[0.9,0.1,0:0,0.8,0.2:0,0.3,0.7] calculate where

$P(X_1)$=0.3,$P(X_2)$ =1/4,$P(X_3)$=0.9/2.

B) What is mutual information? A voice single in a PCM system is (9)

Quantized in 16 levels with following probabilities P1-P4=0.1,P5-P8=

0.05,P9-P12=0.075,P13-P16=0.025, calculate Entropy, Joint entropy And information rate if fm=3KHz.

OR

Q. 2. A) Determine the Lampel ziv code for the following bit stream. (9)

0100111110010100000101010110011000 0.Recover the original Sequence from the encoded stream.

B) State Shannon's first theorem? And obtain efficiency of a Shannon Fano code for a zero memory source that emits six messages(A,E,H,N, G,S) with probabilities of {0.19,0.15,0.02,0.16,0.4,0.08} respectively. Given that A coded as '0'. (9)

Q. 3. A) Obtain the code words for the (6,3) LBC which has the generator Matrix of G-[110100:011010:101001], If code word C=101110 is Transmitted and received code word is r=001110 obtain the correct code word By use of syndrome polynomial. (8)

B) Explain with the help of block diagram JPEG and DTC algorithms. (8)

OR

Q. 4. A) Explain any two properties of mutual information and show that Shannon's limit for AWGN Channel is -1.6db (8)

B) Generate the CRC code for the data word of 110010101 with the divisor having generator polynomial of $X^4 + X^2 + 1$. (8)

Q. 5. A) For the Convolution encoder show in figure (1). Sketch the state Diagrams and Trellis diagram. Find the output data sequence 10011. (8)

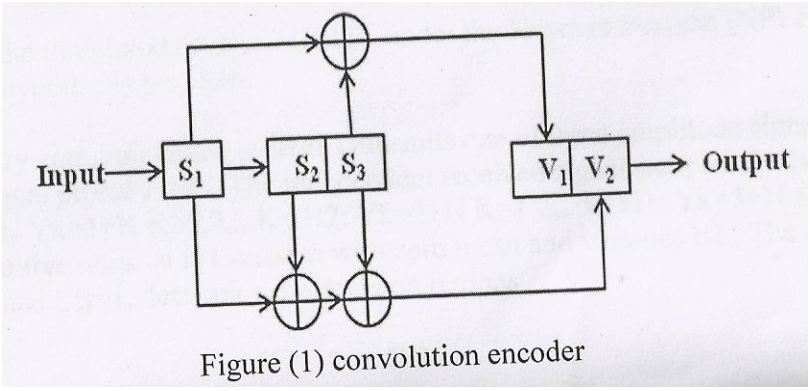

Figure (1) convolution encoder

Figure (1) convolution encoder

B) Write note on FEC and ARQ systems used in coding. (8)

OR

Q. 6. A) Explain importance of coding gain and Unger becks portioning Rule for the 8PSK TCM encoding. (8)

B) The (1/2,3) convolution encoder has generating vectors as g1=(100), g^2=(110) and sketch the encoder and Trellis diagram. And decoded the following sequences using Viterbi algorithm 11100000101. (8)

SECTION-II

Q. 7. A) Design a (7,3) RS double error correcting code, find the systematic Code for the Message $\alpha\ \alpha^3\alpha^5$. (9)

B) What is cryptography technique? Explain AES Encryption and Decryption detail. (9)

OR

Q. 8. A) Design a BCH code with n=15 and error correcting capability (9)

t=1.2.3,

B) Use the prime numbers 3 and 11 to find public key, private key. Also Encrypt plain text m=4 and decrypt it. (9)

Q. 9. A) Discuss the Bays estimation method briefly for Least Square Estimation and kalman filter. (8)

B) What are the criteria for the good Estimator, calculate the unbiased Estimation of DC level With 'A' as unknown in presence of WGN. (8)

OR

Q. 10. A) What is Cramer Rao bound inequality and what are its limitations Discuss in detail. (8)

B) Find maximum likelihood estimator of power of WGN with variance σ^2 unknown with hypothesis H0 and H1with K no. of samples producing zero and m output respectively. (8)

Q. 11. A) Derive the likelihood ratio test (LRT), under the Neyman Pearson (NP) criterion for a binary hypothesis problem. (8)

B) A ternary communication system Transmits one of three amplitude Signals {1,2,3} with equal probabilities, The independent received signal Samples under each hypothesis are H1: Yk=1+N K=1,2,…K, H2:Yk=2+ N K=1,2,…K, H1:Yk=3+N K=1,2,…K , The additive noise N is Gaussian With zero mean and variance σ2, The costs are Cii=0, and Cij-1, determine The decision regions. (8)

OR

Q. 12. A) In a binary communication system received signal is s (t)+n(t) is (8)

Gaussian noise with zero mean. The PDF of two hypotheses are

$f(Y/H_0) = \frac{1}{\sqrt{2\pi}} e^{-y/2^2}$ and $f(Y/H1) = \frac{1}{\sqrt{2\pi}} e^{-(y-1)^2/2^2}$

calculate likelihood Ratio

B) Explain the concept of MINIMAX detector in detail. (8)

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T.E.(E &TC) Examination 2013

Control System

(2008 pattern)

Time-Three hours **Maximum Marks-100**

[Total No. of Question=12] **[Total no. of printed pages= 4]**

Instructions:

(1)Answer 3 questions from each section.

(2)Answer to the TWO sections should be written in separate answer books

(3)Neat diagrams must be drawn whenever necessary.

(4)Figures to the right indicate full marks.

(5)Assume suitable data,if necessary.

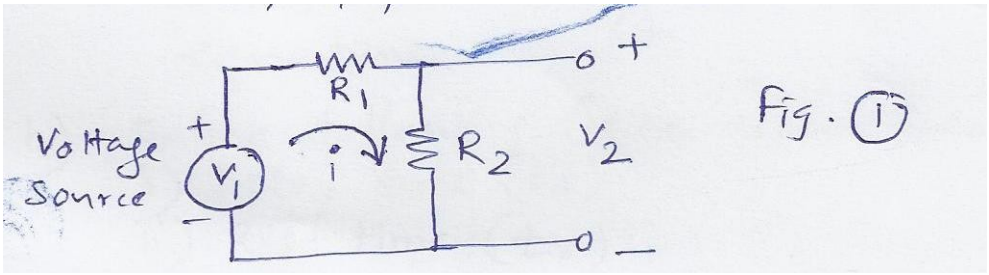
SECTION-I

Q.1 (a)Compare open loop & close loop system. (8)

(b)Consider the voltage divider network of fig.1 The output is V_2 and the input is V_1 . (8)

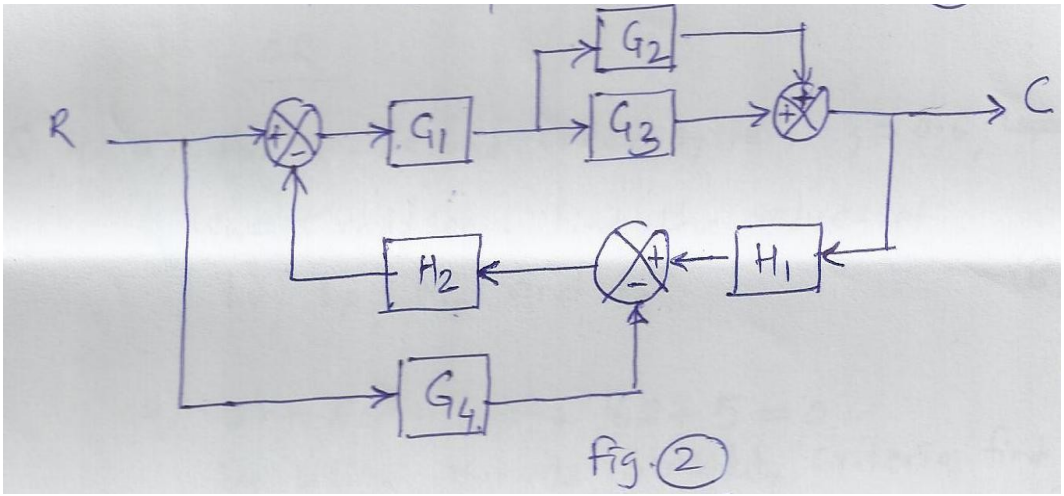
(i)Write an equation for V_2 as a function of V_1 , R_1 and R_2 .

(ii)Write an equation for V_2 in closed loop form ,that is, V_2 as a function of V_1 , R_1 V_2 and R_2 .

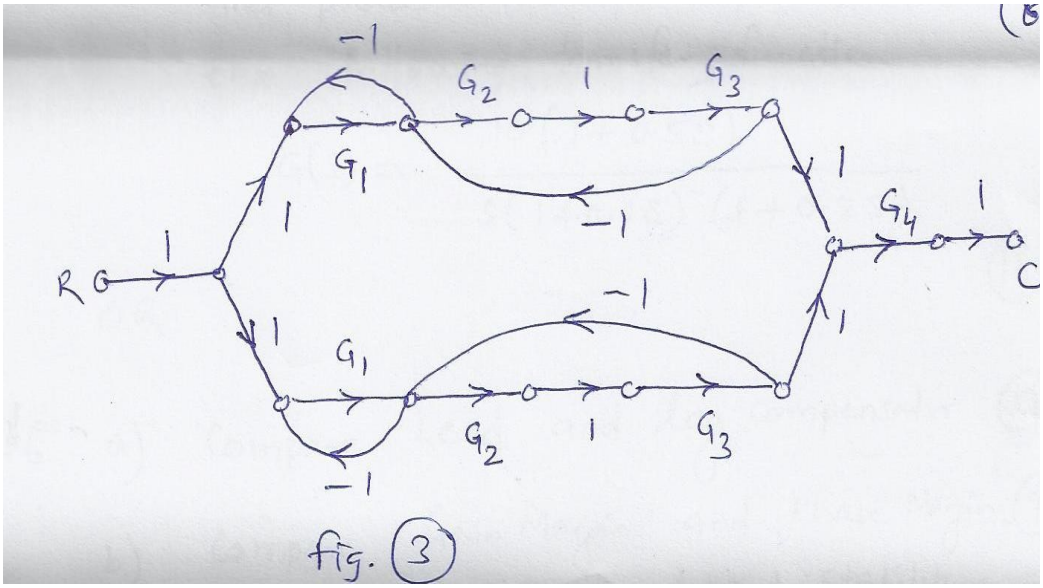


OR

Q.2 (a)Find the closed -loop transfer function of the system shown in fig(2). (8)



(b)Find the transfer function of the system with SFG shown in fig.3. (8)



Q.3 (a)Why standard test signals are used for doing control system analysis?Draw four standard signals used in control system along with necessary equations.

(8)

(b)Define following (time response specification). (8)

(i)Delay time (t_d)

(ii)Rise time (t_r)

(iii)Peak time (t_p)

(iv)Settling time (t_s)

OR

Q.4 (a)For a second order system ξ=0.6 $w_n = 5\,rad/sec.$ .Find the values of t_r, t_p, M_p and t_s . (8)

(b) $s^4+8s^3+18s^2+16s+5=0$ by using Hurwitz stability criteria find system stability. (8)

Q.5 (a)Sketch the bode plots in magnitude and phase shift Vs frequency for the following transfer function $G(S)=\frac{10(1+0.5S)}{S(1+0.1S)(1+0.2S)}$. (18)

OR

Q.6 (a)Compare Lead and log compensator. (9)

(b)Compare Gain Margin and Phase Margin. (9)

Write its important with respect to stability.

SECTION-II

Q.7 (a)Find out the state space model of the following function using Jordan Canonical Form $\frac{Y(s)}{U(s)}=\frac{sa^2+6s_8}{(s+1)^2(s+3)}$. (10)

(b)Write a properties of the state transition matrix. (8)

OR

Q.8 Consider a control system with state model.

$$\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 2 \end{bmatrix} u$$

$\begin{bmatrix} x_1(0) \\ x_2(0) \end{bmatrix} = \begin{bmatrix} 0 \\ 1 \end{bmatrix}$,u=unitstep.

Compute the state transition matrix and therefore find the state response $x(t), t > 0.$ (18)

Q.9 (a)Write short note on "PID controllers". (8)

(b)Write short note on "PLC". (8)

OR

Q.10 (a)Compare P,PI and PID controller. (8)

(b)Draw and explain architecture of PLC. (8)

Q.11 Write a short note on: (16)

(a)SCADA

(b)DCS

(c)Adaptive control

OR

Q.12 (a)Explain Gain scheduling ,why it is required?Explain it suitable example. (8)

(b)Write short note on. (8)

(i)Process control

(ii)Automative control

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T. E. (E&TC) Examination - 2013
DIGITAL COMMUNICATION
(2008 Pattern)

[Total No. of Questions:] **[Total No. of Printed Pages :4]**
[Time : 3 Hours] **[Max. Marks : 100]**

Instructions :

*(1) Answer **any three questions** from each section*
*(2) Answers to the **two sections** should be written in **separate answer-books**.*
(3) Black figures to the right indicate full marks.
(4) Neat diagrams must be drawn wherever necessary.
(5) Use of logarithmic tables, slide rule, Mollier charts, electronics pocket calculator is allowed.
(6) Assume suitable data, if necessary.

SECTION I

Q1 a) Explain LPC encoder in detail with help of block diagram 8

b) A voice signal (300 to 3300 Hz) is digitized such that the quantization distortion <=±0.1% of peak to peak signal voltage Assume a sampling rate of 8000 samples/s and a multilevel PAM waveform with 32 levels. Find the theoretical minimum system bandwidth that avoids ISI. 8

OR

Q2 a) Explain with a neat sketch, the block diagram of digital communication system and discuss the various formatting techniques involved in it. 8

b) Consider a DM system designed to accommodate analog message signals limited to bandwidth W=5 kHz. A sinusoidal test signal of amplitude A=1volt and frequency fm=1 kHz is applied to the system. The Sampling rate of the system is 50 kHz.

i) Calculate the minimum step size Δ required to minimize slope overload.

ii) Calculate signal-to(quantization) noise ratio of the system for the specified sinusoidal test signal. 8

Q3 a) What are the different types of multiplexers used in digital communication system? Explain quasi-synchronous multiplexer in detail with a neat sketch. 10

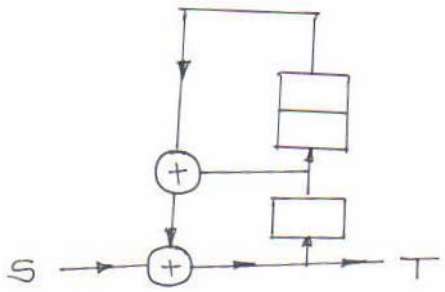
b) Draw the line code formats and PSD waveform for 1 1 1 1 0 0 0 0 and comment on Power Spectral Density.

i) RZ polar ii) NRZ polar iii)AMI iv) Manchester. 8

OR

Q4 a) What is ISI? Hence explain the methods to eliminate the same. 8

b) A srambler is shown in figure. Design the corresponding descrambler. If a sequence S= 1010101000 is applied to the input of this scrambler,determine the output sequence T.Verify that if this T is applied to the input of the scrambler, the output sequence S. 10



Q5 a) Find the Power Spectral Density of random process X(t) defined by

$$X(t) = A\cos(2\pi fct+\phi)$$

Where ϕ is a uniform distributed random variable over the integral $(0,2\pi)$ 8

b) Define mean, correlation, standard deviation and variance of random process. 8

OR

Q6 a) Let X(t) be a zero-mean, stationary, Gaussian process with autocorrelation function Rx(t). This process is applied to a square law device, which is defined by the input-output relation $Y(t)=X^2(t)$ Where Y(t) is the output. Show that the mean of Y(t) is Rx(0). 8

b) Explain stationary,non stationary,wide sense stationary and Ergodic proceses with the help of mathematical expression. 8

SECTION-II

Q7 a) Explain block diagrams for generation and reception of M- ary PSK singals. With suitable mathematical expressions, signal space representation, Bandwidth and PSD. 12

b) Draw signal space and spectral diagram of following digital CW modulation and state only the bandwidth requirement. 16 QAM, 16-ary PSK,QPSK and MSK. 6

OR

Q8 a) Explain the working of QPSK coherent receiver. Sketch the waveform of the inphase and quadrature components of a QPSK signal for binary sequence 1011111010. 10

b) Write a note on 8

i) 16-ary QAM

ii) DEPSK

Q9 a) Derive the expression for the probability of error of a BPSK system. 8

b) Find the error probability for coherent FSK when 8

i) frequency offset is small

ii) frequencies used are orthogonal

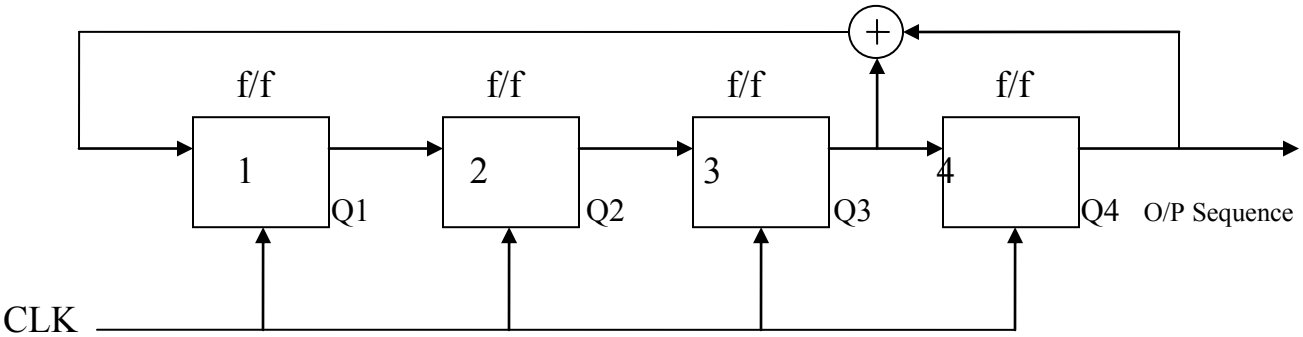
iii) Also find error probability for noncoherent detection.

Given that amplitude of input at coherent optimal receiver is 10mV and freq 1MHz. The signal is corrupted with white noise of PSD 10^-9W/Hz. The data rate is 10^4 bits/sec.
[erfc(1.01)=0.1531, erfc(1.11)=0.1164, erfc(1.22)=0.0844, erfc(1.33)=0.0599]

OR

Q10 a) Binary data is transmitted using PSK at a rate 3 Mbps over RF link having bandwidth 10 MHz. Find signal power required at receiver input so that error probability is less than or equal to 10^{-4}. Assume noise PSD to be 10-10 watt/Hz. ($Q(3.71) = 10^{-4}$). 8

b) Derive the error probability of Matched Filter 8



Q11 a) For the shift register given in problem, demonstrate the balance property of PN sequence. Also calculate & plot auto-correlation function of the PN sequence produced by this shift register. 10

b) Draw block diagram of satellite transponder. Explain the purpose of frequency down converter and TWT. 6

OR

Q12 a) Consider a slow hop spread spectrum system with binary FSK, two symbols per frequency hop, and a PN sequence generator with outputs with the binary message of 0 1 1 0 1 1 0 1 1 0 0 0. The message is transmitted using the following PN sequence with k=3:{010,110,101,100,000,101,011,001,001,111,011,001}, plot the output frequencies for the input message. 8

b) Write a note on 8

i. IS 95 standard

ii. Diversity techniques

UNIVERSITY OF PUNE

[4363]-183

T. E.(Electronics & Telecomm-Semester-I) Examination - 2013

NETWORK SYNTHESIS & FILTER DESIGN(304183)

(2008 Pattern)

[Total No. of Questions :] **[Total No. of Printed Pages :4]**

[Time : 3 Hours] **[Max. Marks : 100]**

Instructions :

*(1) Answer **any three** from each Section.*

*(2) Answers to the **two sections** should be written in **separate answer-books**.*

(3) Black figures to the right indicate full marks.

(4) Neat diagrams must be drawn wherever necessary.

(5) Use of electronic pocket calculator is allowed.

(6) Assume suitable data, if necessary.

SECTION –I

Q.1 a)Define the terms causality & realizability state and explain the condition for stability of a network [6]

b) What is positive real function? State the necessary and sufficient condition for a function to be positive real. [6]

c) Test whether following polynomial are Hurwitz [6]

i) $S^4 + S^3 + 4S^2 + 2S + 3$

ii) $S^4 + S^3 + 5S^2 + 3S + 4$

OR

Q.2 a) Explain the following removal operations [6]

i) Removal of pole at s= ∞ from given function

ii) Removal of pole at s= o from given function

b) Test whether the following function are positive real [6]

i) $F(s) = \frac{S^2\ 2s+25}{s^2+5s+16}$

ii) $F(s) = \frac{3S^2+5}{s(s^2+1)}$

c) A network shown in **figure1** has driving point impedance Z(s) with the poles and zeros located at the following places. [6]

Poles at $-\frac{1}{2} \pm j\frac{\sqrt{3}}{2}$ and zero at -1. If Z(0) = 1 Ω Determine the values of component R, L and C.

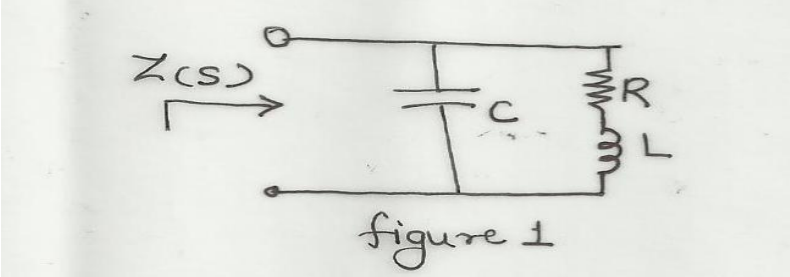


figure 1

Q. 3 a) State properties of L-C driving point impedance of admittance function[4]

b) Realize the following R-C driving point impedance function in [6]

i) Foster I form ii) Caner I from

$$Z(s) = \frac{S^2 + 6s + 8}{s^2 + 4s + 3}$$

c) Identify the following R-C network function and synthesize the same. [6]

$$Z(s) = \frac{S^{2+}\ 2s + 2}{s^2 + s + 1}$$

OR

Q.4 a) Identify the following network function with proper justification [6]

$F(s) = \frac{2(s+2)(s+4)}{(s+3)(s+6)}$ Synthesize the same using foster II form.

b) State properties of RL driving point impedance function. Draw and explain reactance curves for R-L network [4]

c) Synthesize the following L-C function using Cauer –I form [6]

$$Z(s) = \frac{S^2 + 10s^3 + 12s}{s^4 + 4S^2 + 3}$$

Q.5 a) What is meant by zeros of transmission? Determine ZOTs of the network shown in **figure 2** [4]

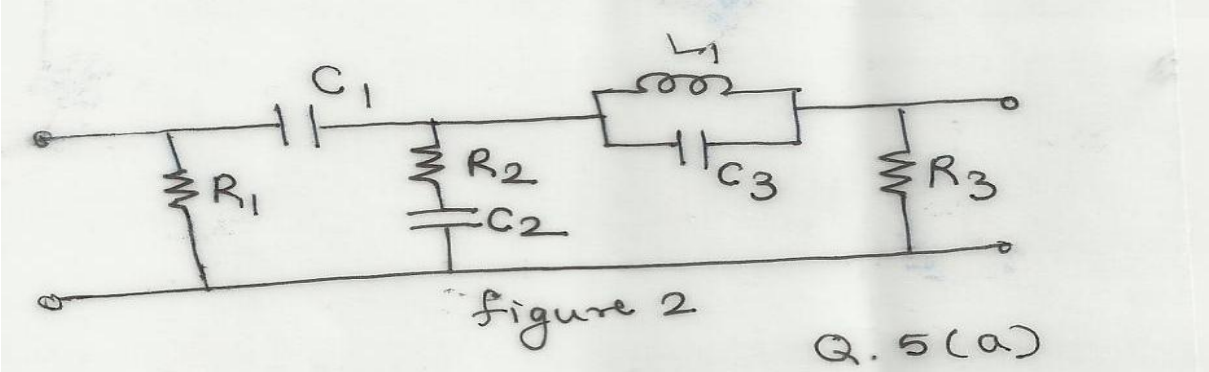


Figure 2 Q.5(a)

b) Synthesize the voltage ratio $\frac{V_2}{V_1} = \frac{S^2+1}{S^2+2S+1}$ as a constant resistance bridged T network terminated in a 1 Ω resistor [6]

c) State properties of transfer function. Obtain transfer function of two part network in terms of z parameters [6]

OR

Q.6 a) State reside condition. Determine whether the reside condition holds for following network shown in **figure 3** [4]

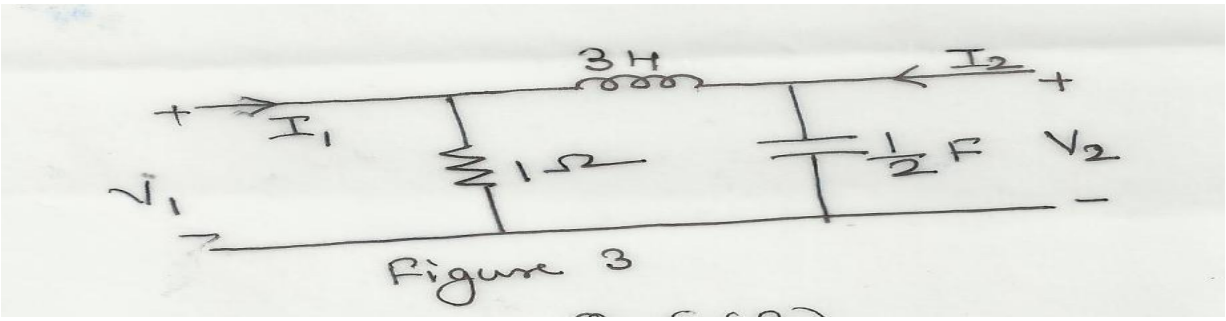


Figure 3

b) Synthesize $Z_{21}(s) = \frac{2}{S^3+3S^2+4s+2}$ into L-C ladder network with 1 Ω termination. [6]

c) Realize the following voltage ratio transfer function using a constant resistance lattice network with 1 Ω termination. [6]

$$\frac{V_2}{V_1} = \frac{4}{s+6}$$

SECTION – II

Q.7 a) State properties of a Buffer worth filter obtain transfer function and realize third order normalized LPF Butterworth filter convert if into LPF with out-off frequency $W_c = 10^4$ rad/see and load impedance of 500 Ω [12]

b) Write short note on frequency Transformation [6]

OR

Q.8 a) Synthesize a chebysher LPF to meet following specifications [18]

i) Load resistance 600 Ω

ii) $\frac{1}{2}$ db ripple with pass bond

iii) Cut-off frequently 5 x 10^5 rad/see

iv)At 1.5 x 10^6 rad/ see magnitude must be down 30 db.

Q.9 a) Explain with suitable example the coefficient matching technique for obtaining element values. [8]

b) Explain the position feedback topology used in active filter design and obtain it's transfer function. [8]

OR

Q.10 a) Synthesize the following HPF function using RC-CR transformation on sullen key LPR [8]

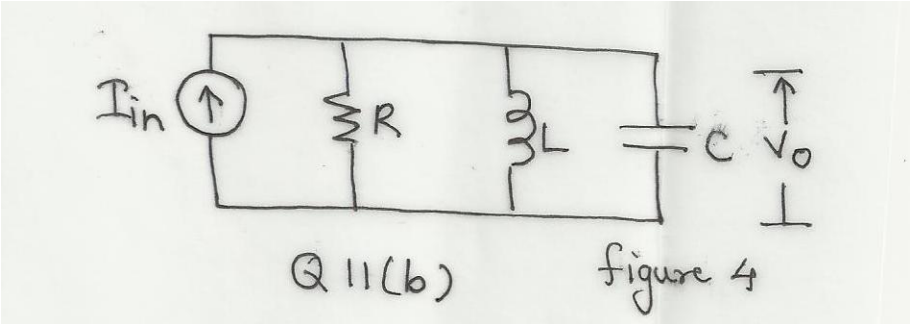
$$H_{HP}\ (s) = K\frac{S^2}{S^2+s+25}$$

b) Write short note on [8]

i) FDNR ii) Gyrator

Q.11 a) What is multi element deviation ? Define variability and device expression for per unit change in parameter p due to simultaneous variation in all element [8]

b) For the network shown in **figure 4** determine the transfer function Vo/I_{in} and compute sensitivity of Qp, Wp and k with respect to the passive element R, L, C. (8) [8]



Q 11(b) figure 4

OR

Q.12 a) Discuss the effect of parameter of OP-AMP on the performance of active filters. [8]

b) Explain the concept of gain sensitivity. Explain the various factors affecting gain sensitivity [8]

[Total No. of Questions: *12*] **[Total No. of Printed Pages: 2]**

UNIVERSITY OF PUNE
[4363]-187
T. E. (*E & TC*) Examination - 2013
SYSTEM PROGRAMMING AND OPERATING SYSTEM
(2008 Course)

[Time: *3* Hours] **[Max. Marks: 100]**

Instructions:

1 *Answers to the* ***two sections*** *should be written in* ***separate answer-books****.*

2 *Neat diagrams must be drawn wherever necessary.*

3 *Assume suitable data, if necessary.*

SECTION -I

Q.1	A	What do you understand by Grammar? Explain the use of Terminal and Non-Terminal in representing grammar.	4
	B	Explain Allocation data Structures used in language processing.	4
	C	How Pass I of an assembler works. Explain the algorithm in detail with data structures used.	8
		OR	
Q.2	A	What are language processor development tools? Explain the working of Lex and YACC.	8
	B	Define following terms and explain where it is used with examples. (i)DFA (ii)Regular Expression (iii)Forward Reference (iv)Back Tracking	8
Q. 3	A	Explain the process of Macro Expansion with relevant data structures.	8
	B	Explain the use of Register Descriptor and Operand descriptor.	6
	C	What are the differences between Compiler and Interpreter?	4
		OR	
Q. 4	A	List down various code optimization techniques. Explain any two techniques in detail with example.	8
	B	Explain the process of alteration of flow of control during macro expansion.	4
	C	List down the steps in designing a Macro Preprocessor.	6

Q. 5	A	Why program relocation is required and how is it performed?	6
	B	Explain the five different types of editor with their applications?	10
		OR	
Q. 6	A	In case of a Direct Linking Loader, what is the information required to be passed by a translator to the loader.	4
	B	Explain the need of a linker in program development.	4
	C	List down the components of a programming environment. Explain any two components in detail.	8
		SECTION II	
Q. 7	A	Explain functions of an Operating System.	8
	B	Write short notes on the following. (i)Process Control Block (ii)Critical Section (iii)Round Robin Scheduling	10
		OR	
Q. 8	A	What are deadlock? How deadlocks avoided in operating system. Explain it with suitable example.	8
	B	Draw and explain process state transitions.	6
	C	Explain preemptive and non preemptive concept with example.	4
Q. 9	A	Give similarities and differences between paged and segmented memory management schemes.	8
	B	How virtual memory system is utilized in memory management? Explain in details.	8
		OR	
Q. 10	A	Mention different page replacement algorithms and explain any one of them.	8
	B	How operating system utilizes swapping technique in memory management? Explain in details .	8
Q. 11	A	Explain different I/O software layers.	8
	B	Draw and briefly explain the file structure.	8
		OR	
Q. 12		Write short note on . 1.File management 2.Disc space management 3.Interface management 4.Power management	16

[Total No. of Questions: 12] **[Total No. of Printed Pages: 3]**

UNIVERSITY OF PUNE

[4363]-188

T. E. (E & TC) (SEMISTER -II)Examination - 2013

COMPUTER ORAGNISATION AND ARCHITECTUTRE

(2008 Course)

[Time: 3 Hours] **[Max. Marks: 100]**

SECTION –I

Q.1	A	Perform division of the following numbers using restoring and non restoring division algorithm. A: 1100 and B: 0100	10
	B	Write the help of flow chart explain floating point multiplication operation.	8
		OR	
Q.2	A	Multiply (-7) and (+3) using Booth's algorithm. Register size is 5 bits.	10
	B	Represent the following numbers in single precision format $(42.625)_{10}$	4
	C	Draw and explain Basic structure of CPU	4
Q. 3	A	Write control sequence for the execution of following instruction. SUB R_4, R_6	8
	B	Draw and explain hardwired control unit	4

	C	Draw and explain multiple bus organization of CPU.	4

OR

Q. 4	A	Draw and explain organization of single bus CPU with control signals.	8
	B	Draw and explain micro programmed control unit.	4
	C	Write sequence of control signals for memory read and memory write operations.	4
Q. 5	A	Draw and explain USB signals for USB communication. Explain bus protocol and four types of data transfer for USB	8
	B	Differentiate memory mapped I/O and I/O mapped I/O.	4
	C	Write short note on cache organization.	4

OR

Q. 6	A	Draw and explain construction of static and dynamic RAM.	8
	B	Compare programmed and interrupt driven I/O.	4
	C	Explain any two DMA data transfer modes.	4

SECTION II

Q. 7	A	Write an assembly language program for 8086 to calculate how many times character ‘A’ appears in string. Store result in data segment	8
	B	Draw a bit pattern of flag register and explain significance of each bit.	8

OR

Q. 8	A	Draw interrupt vector table of 8086 and explain dedicated interrupts.	8

	B	Explain following instructions of 8086. i) far CALL ii) PUSHF iii) XLAT iv) AAM	8
Q. 9	A	With the help of diagram explain address calculation in protected mode of 80386, when paging is enabled	10
	B	Explain real mode of 80836	8
		OR	
Q. 10	A	With the help of diagram explain task switch operation without task gate in 80386.	10
	B	Draw and explain format of non system segment descriptor.	8
Q. 11	A	Draw and explain ARM core data flow model.	8
	B	Draw and explain Flynn's classification of various computer architecture	8
		OR	
Q. 12	A	Write short note on i) Instruction pipelining ii) Superscalar processors	8
	B	Differentiate followings i) RISC and CISC ii) Loosely Coupled and Tightly Coupled	8

[Total No. of Questions: *12*] **[Total No. of Printed Pages:** *3*]

UNIVERSITY OF PUNE
[4363]-189
T. E. (E & TC) Examination - 2013
INDUSTRIAL MANAGEMENT(304190)(2008 Course)
[Time: *3* **Hours]** **[Max. Marks: 100]**

Instructions:

1 *Answers to the* ***two sections*** *should be written in* ***separate answer-books****.*

2 *Black figures to the right indicate full marks.*

3 *Your answer will be valued as a whole*

4 *Neat diagrams must be drawn wherever necessary.*

5 *Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*

7 *Assume suitable data, if necessary.*

SECTION –I

Q.1	A	What are the different managerial levels? Elaborate on the different skills required at each level.	8
	B	Define an "Organization". What are its common characteristics? Compare a "Traditional Organization" and "New Organization"	8

OR

Q.2	A	Explain the "General Administrative Theory" in Management proposed by Max Weber.	8
	B	What in the Organizational Behavior approach in Management? Elaborate the concept "Organization as an Open system"	8
Q. 3	A	Explain Mintzberg's 5 Ps of strategy. How these will be useful in developing a robust business strategy?	8
	B	Prepare the Environmental Threat and Opportunity Profile (ETOP) of a manufacturing industry	8

OR

Q. 4	A	Explain the following levels of strategy – i) Corporate ii) Business iii) Functional iv) Operational	8
	B	Comment on the Statement "A greater collective force means less collective profitability of industry firms and lower industry attractiveness"	8
Q. 5	A	Explain the importance of ISO 27001 : 2005. Information Security Management System Standards in detail with proper example.	10
	B	Explain the 5s Quality Management Standards.	8

OR

Q. 6	A	Explain the basic philosophy of Total Quality Management (TQM). What are the limitations of this technique?	10
	B	What is Poka -Yoke? What are the Micro level techniques used in this?	8

SECTION II

Q. 7	A	Draw the standard graph of Break Even Analysis and define the following terms: i) Break even point ii) Contribution per unit iii) Margin of Safety iv) Marginal cost	8
	B	What are the limitations of Break Even analysis?	4
	C	Using the following data, calculate the break even point and margin of safety in units Selling price $50 Variable cost $40 Fixed Cost $70,000 Budgeted Sales 7,500 units	4

OR

Q. 8	A	What do understand by a Project Network? Define following w.r.t. the same 1) Activity on node (AON) 2) Activity on arrow (AOA)	8
	B	With the help of an example, explain the Critical Path	8

Method in Project Management

Q. 9	A	With suitable example, explain Independent Demand and Dependent Demand in Inventory Management	4
	B	What are the different types of inventories?	4
	C	Explain the EOQ model in inventory control	8
		OR	
Q. 10	A	What do you understand by "Supply Chain Management (SCM)"? Explain the various stages in SCM.	8
	B	Compare among the HML, FSN and VED analysis	8
Q. 11	A	List different types of e-Commerce. Explain B2B in detail.	8
	B	Define ERP and ERP systems ? What are its benefits? What are the difficulties in implementing ERP?	10
		OR	
Q. 12	A	What is MIS? Explain its purpose and objectives with suitable example.	10
	B	With suitable example, elaborate the philosophy of Business Process Reengineering	8

[Total No. of Questions: 12] **[Total No. of Printed Pages: 3]**

UNIVERSITY OF PUNE
[4363]-190
T. E. (E& TC) Examination - 2013
WAVE THEORY AND ANTENNA
(2008 Pattern)

[Time: 3 Hours] **[Max. Marks: 100]**

Instructions:

1. *Answers to the two sections should be written in separate answer-books.*
2. *Black figures to the right indicate full marks.*
3. *Neat diagrams must be drawn wherever necessary.*
4. *Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*
5. *Assume suitable data, if necessary.*
6. *Answer three question from each section*

SECTION -I

Q.1 A Derive and expression of attenuation constant, phase constant and intrinsic impedance in terms of medium constant for wave propagating in lossy dielectrics. 10

B A uniform plane wave in free space is given by $\bar{E} = (200\angle 30^0)\, e^{-j\,250\,Z} \acute{a}_x$ V/m. Find 6

a) direction of propagation of wave
b) Angular frequency
c) Wavelength
d) Intrinsic impedance in free space
e) Magnetic field intensity

OR

Q.2 A Derive an expression of wave equations in terms of an electric and magnetic field. 10

B Find the skin depth at frequency of 1.6 *MHZ* in aluminum, where $\sigma = 38.2\times10^{-6}$ *mho/m* and $\mu_r = 1$. Also find wave velocity and wave propagation constant. 6

Q. 3 A What are the various modes of propagation of radiation between a transmitter and receiver? 12

	B	A base station transmits a power of 10KW into a feeder cable with a loss of 10 dB. The transmit antenna has a gain of 12dBd in the direction of a mobile reciver, with antenna gain 0dBd and feeder loss 2dB. The mobile receiver has a sensitivity of – 104 dBm. i. Determine the effective isotropic radiated power. ii. Determine the maximum acceptable path loss.	4
		OR	
Q. 4	A	Explain the characteristics of the ionospheric layer.	8
	B	Explain the terms Maximum usable frequency, skip distance, diffraction and earth curvature.	8
Q. 5	A	Explain the antenna parameters with the help of illustrative diagrams, relative diagrams and mathematical expressions of Radiation intensity, antenna efficiency, antenna gain directivity, input impedance, beamwidth and radiation pattern	14
	B	An antenna has loss resistance of 20 ohm, power gain of 50 and directivity of 80. Determine its radiation resistance.	4
		OR	
Q. 6	A	Derive an expression of electric and magnetic field intensity in terms of vector potential $\underset{F}{\rightarrow}$ and magnetic current source $\underset{M}{\rightarrow}$.	12
	B	Calculate the electric field intensity at a distance of 15Km from an antenna having a directive gain of 5 dB and a total radiated power of 80Kw.	6
		SECTION II	
Q. 7	A	Prove that the radiation resistance of an Hertzian dipole is $R_{rad} = 80\pi^2 \left(\frac{l}{\lambda}\right)^2$	12
	B	A loop antenna consists of 30 turns, each having an area of $3m^2$. A radio wave having a frequency of 60MHz induces a sinusoidal e.m.f. of 500 mV in this antenna when it is oriented for maximum response. Calculate the peak value of the electric field intensity E of the RF wave	4
		OR	
Q. 8	A	Design a broad side Dolph-Tschebhysheff array of 10	10

		elements with half wavelength spacing between elements and with major to minor lobe ratio to be 26dB. Find the excitation coefficients.	
	B	A dipole carries r.m.s. current of 200 A at 250 MHz. its length is one meter. Calculate: a) Power radiated by the antenna. b) Effective height of the antenna. c) Directive gain of the antenna.	6
Q. 9		Write short notes on the following antennas(any four)with respect to structural details, radiation pattern, features and applications: a) Rhombic antenna b) Beverage antenna c) Ferrite rod antenna d) Loop antenna	16
		OR	
Q. 10	A	Explain the effect of grounding on antenna performance with illustrative diagrams	8
	B	Sketch and explain in brief long wire antenna.	8
Q. 11		Write a short notes on a) Corner reflector antenna b) Helical antenna c) Microstrip antenna	18
		OR	
Q. 12		Write a short notes on a) Turnstile antenna b) Biconical antenna c) Horn antenna	18