Total No. of Printed Pages:2

SUBJECT CODE NO:- H-160
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E. (EC/ECT/IEC/E&C)
Microcontroller & Advanced Processors
(REVISED)

[Time: Three Hours] **[Max. Marks: 80]**

Please check whether you have got the right question paper.

N.B
i. Question No 1 & 6 are compulsory
ii. Answer any two questions from the remaining questions of each section
iii. Assume suitable data whenever necessary

Section- A

Q.1 Solve any Two 10

a) Find the physical address of memory locations referred to in the following instruction if DS=8000H, DI=143A,& SI=1A32
   1. mov [DI],AL
   2. mov[SI][704],AX
   3. movBX,[4321H]

b) Explain minimum mode configuration of 8086

c) Explain i) Assume ii) END iii) SEGMENT

Q.2 a) Draw and explain 8086 Architecture 08
b) Explain in detail interrupts of 8086 07

Q.3 a) Explain the following instructions 08
   i. MUL
   ii. LEA
   iii. IDIV
   iv. SAHF

b) WAP to transfer the block of 10 bytes using string instructions. 07

Q.4 a) Explain 8255 interfacing with 8086 08
b) Explain keyboard interfacing with 8086 07

Q.5 Write short note (any three) 15
a) Pipeline
b) PUSH & POP instructions
c) memory segmentation
d) Instruction format of 8086

Section - B

Q.6 Solve any two 10

a) Explain in details 80286 features
b) Explain addressing modes of 8051
c) Explain SFR'S in 8051

Q.7 a) Explain the Protected virtual addressing mode of 8086 08

b) Draw and explain 80386 Architecture 07

Q.8 a) Explain following Registers of 8051 08

1. SCON
2. IP
3. IE
4. B

b) Explain in detail memory organization of 8051 07

Q.9 a) Design a 8051 microcontroller based system with 10

1. 8255
2. 8KB EPROM
3. 4KB RAM

b) WAP to generate a delay of 1 μs with crystal of 12MH_Z using timer 0 of 8051 05

Q.10 Write short note on (any three) 15

i. Port 3 of 8051
ii. Stepper motor interfacing with 8051
iii. T MOD Register
iv. Modes of timer in 8051

Total No. of Printed Pages:3

SUBJECT CODE NO: H-125
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E. (EC/ECT/E&C)
Signal Coding & Estimation Theory
(REVISED)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B i) Q.No.1 from section A and Q.No.6 from section B are compulsory.
ii) Attempt any two questions from the remaining questions in each section

Section A

Q.1 Write short notes on (any two) 10
a) LZW algorithm
b) Lossless channel
c) Mutual information & it's properties.

Q.2 a) An analog signal is band limited to 500 KHz. It is sampled at Nyquist rate and samples are quantized into 4 levels. Each level represents one symbol. Probability of occurrence of these 4 levels (symbols) are $P(x_1) = P(x_4) = \frac{1}{8}$ and $P(x_2) = P(x_3) = 3$ obtain entropy of source and information rate of the source. 08

b) Prove that mutual information of a channel is symmetric i.e. $I(x, y) = I(y, x)$ 07

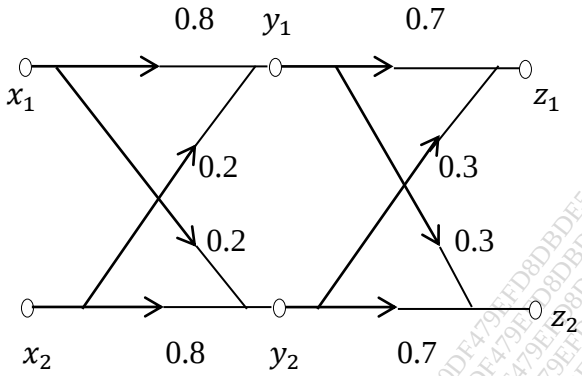
Q.3 a) Explain Huffman coding Algorithm with one example. 07

b) Apply the Shannon-fano coding procedure for following message group and determine the average length and efficiency of this coded system. 08

M	M_0	M_1	M_2	M_3	M_4	M_5	M_6	M_7
P	$1/4$	$1/8$	$1/16$	$1/16$	$1/16$	$1/4$	$1/16$	$1/8$

Q.4 a) Compare between Binary symmetric channel and Binary Erasure channel. 07

b) Two binary symmetrical channels are connected in cascade as shown in figure. Find the channel matrix of resultant channel. Also find $P(z_1)$ and $P(z_2)$ if $P(x_1) = 0.6$ and $P(x_2) = 0.4$ 08



Q.5 a) State and prove channel coding theorem. 07

b) Explain Arithmetic coding with one example. 08

Section B

Q.6 Write short notes on :- (any two) 10

a) Error detection and error correction capability

b) Tree diagram and Trellis diagram

c) Golay codes & fire codes

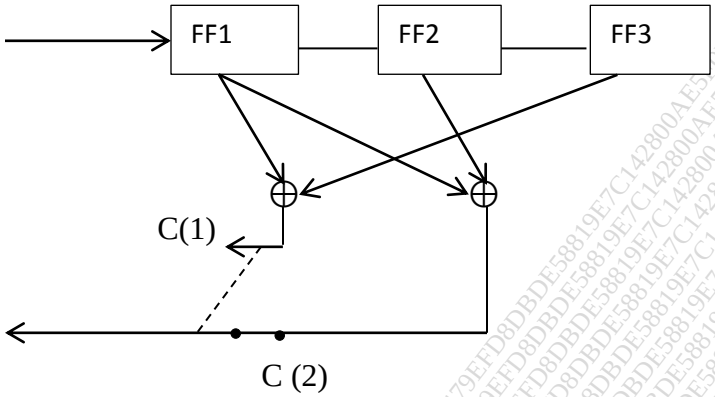
Q.7 a) For a(6,3) linear block code, the coefficient matrix [P] is as follows, 08
The received code words at the receiver are :-
i) 001110
ii) 111011
Check whether they are correct or contain errors.

b) Explain Syndrome decoding for linear codes with neat diagram. 07

Q.8 a) The generator polynomial of a (7, 4). Cyclic code is $g(x) = 1 + x + x^3$. Find the 16 codewords of this code. 08

b) Explain BCH Codes. 07

Q.9 a) For the convolutional Encoder shown in figure, Determine the output for input sequence = 11010100 08



Output switch

b) Explain Viterbi Decoding Algorithm. 07

Q.10 What is Estimation theory? Explain Maximum likely hood Estimation and least square estimation methods. 15

Total No. of Printed Pages:4

SUBJECT CODE NO:- H-195
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E. (EC/ECT/IEC/E&C)
Electronics System Design
(REVISED)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B
i) Question no.01 and Question no.06 are compulsory.
ii) Solve any two questions from the remaining questions of each section A and B.
iii) Assume suitable components and data wherever necessary.
iv) Figures to the right indicate full marks.
v) Required data sheet is provided.

Section A

Q.1 Solve any two 10
a) Explain features of fixed voltage regulator IC 78 XX
b) Enlist selection criteria for capacitor.
c) List the characteristics of opamp.
d) List the features, absolute maximum ratings and electrical characteristics of IC temp sensor LM 35.

Q.2 a) Outline the procedure to design adjustable regulator using LM 317. How output current is increased in such regulator. 07

b) Design the o/p equation of opamp based differentiator. 08

Q.3 a) Design ckt for light intensity measurement by using photodiode. 07

b) Design a bass/treble control ckt using LM 833 with following specifications : $f_B = 20Hz, f_T = 12KHz$ and $\pm 20dB$ maximum boost/cut at both ends. 08

Q.4 a) Design voltage to current amplifier using opamp with following specification $I_i = \frac{V_i}{1k\Omega}$, assume grounded load. 07

b) By using 78540 IC design a step down switching regulator to give the output voltage of 5V at a maximum load current of 600 mA for input voltage of 10V. The ripple in the output voltage be less than $20mV_{pp}$. 08

Q.5 a) Explain how components $R_{INT}, C_{INT}, V_{REF}, C_{AZ}, R_{OSC}, C_{osc}$ are selected in IC 7106/7107 design. 07

b) Using LM 339 design a Schmitt trigger with following specifications 08
$V_{cc} = 12V, V_{OL} = 0V, V_{OH} = 5V, V_{TL} = 1.5V, V_{TH} = 2.5V$

Section B

Q.6 Solve any two 10

a) Explain the features of IC 565.
b) Draw pin diagram of IC 7490 and explain in detail.
c) Explain DCB design rules in digital circuits.
d) Explain design rules for heat sink.

Q.7 a) Explain finite state machine in detail. 07

b) Design DC voltmeter with internal resistance of 50Ω and full scale deflection current $I_{fsd} = 50\mu A$, for voltage range of 0, 10V, 30V, 250V. 08

Q.8 a) Explain heat transfer fundamentals in context with electronics circuit design. 07

b) Design a ICL 8038 based waveform generator to make o/p frequency adjustable to the wide range while keeping value of capacitor c constant and equal to 3600 PF. Also calculate the o/p frequency extremes with symmetrical triangular wave. The peak amplitude of the wave is 2.5. 08

Q.9 a) Explain exponential law of reliability. 07

b) Find out failure rate if 10,000 microcontroller chips are operated for a period of 1000 hours out of which 10 fails. 08

Q.10 Write short note on 15

i) LM 380 Audio amplifier
ii) Astable multivibrator
iii) Sample & hold circuit

Data Sheet

	Device	Type	Icmax	VcEo	Vcbo	Ptmax	Life min	f_r
1.	General Purpose Transistors:							
1)	2N 2996	NPN	100 mA	18 V	18 V	200 MW	200	200 MHz
2)	BFY 51	NPN	1 Amp	30 V	60 V	800 MW		50 MHz
3)	2N 3702	PNP	200 mA	25 V	40 V	300 MW		100 MHz
4)	BCY 70	PNP	20 mA	40 V	50 V	300 MW		200 MHz
2.	Small Signal Transistors:							
1)	BC 107	NPN	100 mA	45 V	50 V	300 MW	110	
2)	BC 157	PNP	100 mA	45 V	50 V	300 MW	470	

3. Switching transistors:

1)	2N 2219 A	NPN	800 mA	40 V	75 V	800 MW	75	200 MHz
2)	2N 2905	PNP	600 mA	40 V	60 V	600 MW	150	

4. RF Transistors:

1)	2N 2969 A	NPN	200 mA	15 V	40 V	360 MW	40	500 MHz
2)	BFY 90	NPN	50 mA	15 V		200 MW		14 GHz
3)	BC 177	PNP	100 mA	45 V	50 V	300 MW	75	130 MHz
4)	BC 178	PNP	100 mA	25 V	30 V	300 MW	75	130 MHz

5. Driver Transistors:

1)	2N 3053	NPN	700 mA	40 V	60 V	800 MW	125	100 MHz
2)	2N 2905	PNP	1 A	40 V		600 MW	100	

6. Power Transistor:

1)	2N 3055	NPN	15 A	60 V	100 V	115 W	20	1 MHz
2)	BD 131	NPN	3 A	45 V	70 V	15 W	20	60 MHz
3)	BD 132	PNP	3 A	45 V	45 V	15 W	20	60 MHz
4)	TIP 31 A	NPN	3 A	60 V	60 V	40 W	10	8 MHz
5)	TIP 32 A	PNP	3 A	60 V		40 W		8 MHz
6)	SL 100	NPN	0.5 A	50 V		4 W	40	
7)	SK 100	PNP	0.5 A	50 V		4 W	40	

7. Darlington Transistors:

1)	TIP 132	NPN	8 A	100 V	100 V	70 MW	1000	1 MHz
2)	TIP 137	PNP	8 A	100 V	100 V	70 MW	1000	1 MHz

1. Resistor Std. Values ($\Omega, k\Omega, M\Omega$, with fixed values) :
   1.0, 1.1, 1.2, 1.3, 1.5, 1.6, 1.6, 2.0, 2.2, 2.4, 2.7, 3.0, 3.3, 3.6, 3.9, 4.3, 4.7, 5.1, 5.6, 6.2, 6.8, 7.5, 8.2, 9.1.

2. Capacitance Values ($\mu F, nF, pF$):
   0.1, 0.15, 0.22, 0.33, 0.47, 0.60 and multiples of 10.

3. Inductance Values ($H, mH, \mu H$):
   1.0, 1.1, 1.2, 1.3, 1.5, 1.6, 1.8, 2.0, 2.2, 2.4, 2.7, 3.0, 3.3, 3.6, 3.9,3.9, 4.7, 5.1, 5.6, 6.2, 6.8, 7.5, 3.2, 9.1

4. Diodes:

Normal:	Device	PIV	I_f
	EC 103	100 V	3 Amp
	EC 403	400 V	3 Amp
Rectifier :	IN 4001	50 V	1 Amp
	IN 4007	1000 V	1 Amp

5. Zener Diodes:

Types No:	V_s	$I_n(mA)$	$Z_n(\Omega)$	$I_m(mA)$
1N 4370	2.4 V	20	30	150
1N 4371	2.7 V	20	30	135
1N 4372	3.0 V	20	29	120
1N 746	3.3 V	20	20	110
1N 747	3.6 V	20	24	100
1N 748	3.9 V	20	23	95
1N 749	4.3 V	20	22	85
1N 750	4.7 V	20	19	75

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-316
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E. (EC/ECT/IEC/E&C)
Microprocessors & Peripheral
(REVISED)

[Time: Three Hours] **[Max.Marks: 80]**

Please check whether you have got the right question paper.

N.B
1. Q.No.1 & Q.No.6 are compulsory.
2. Solve any two from Q.No.2, Q.No.3, Q.No.4 & Q.No.5.
3. Solve any two from Q.No.7, Q.No.8, Q.No.9 & Q.No.10.
4. Assume suitable additional data if necessary.

Section A

Q.1 Attempt any two of the following.

i) Explain different software development tools need to be by the programmer. 05
ii) Explain flag structure of 8085 microprocessor. 05
iii) Explain the concept of stack & subroutine. 05
iv) What are the different types of memory mapping? 05

Q.2
a) Write the different addressing modes of 8085. 07
b) Draw the timing diagram of MOV R_1, R_2. 08

Q.3
a) Draw & explain pin diagram of 8085. 07
b) Write a program to transfer block of data from one memory location to another. 08

Q.4
a) Draw & explain interrupt structure. 07

b) Design a fully decoded memory system that provides 2KB of EPROM immediately followed by 4KB of RAM. The EROM starts at address 0000H. 08

Q.5
a) Write a program to multiply two 8 bit numbers. 07
b) Write the classification of memory & explain it. 08

Section B

Q.6 Attempt any two of the following.

i) Compare 8155 & 8355 — 05

ii) Write the features of 8255 — 05

iii) Enlist the silent features of 8155. — 05

iv) Write the difference between serial & parallel data communication. — 05

Q.7 a) With the help of interfacing diagram. Explain LED interfacing with 8255 & write program to turn OFF & ON LED. — 07

b) With the help of neat diagram explain 0809 interfacing with 8085 to measure analog signals. — 08

Q.8 a) Draw & explain the block diagram of 8253. — 07

b) Interface 8255 with 8085 & explain how you can transmit data bytes parallelly — 08

Q.9 a) Explain speed control of DC motor using microprocessor. — 07

b) Explain logic analyzer with the help of diagram. — 08

Q.10 a) With the help of neat diagram explain interfacing of stepper motor with 8255 & write a program to rotate a motor in clockwise by 90^0. — 07

b) Explain block diagram of 8355 & write its features. — 08

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-295
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E. (EC/ECT/IEC/E&C)
Electromagnetic Engineering
(REVISED)

[Time: Three Hours] **[Max. Marks: 80]**

Please check whether you have got the right question paper.

N.B
i) Q.No.1 and Q.No.6 are compulsory.
ii) solve any two questions from Q.2, Q.3, Q.4 and Q.5 in section A
iii) solve any two questions from Q.7, Q.8, Q.9 and Q.10 in section B
iv) figures to the right indicate full marks
v)assume suitable data wherever necessary and mention it clearly

Section A

Q.1 Solve any two 10
i. Explain divergence theorem
ii. Derive the boundary conditions for a conductor free space interface
iii. Explain energy density in an electrostatic field

Q.2 a. Given the points A(x=2, y=3,z= -2) and $B(r = 8, \theta = 25^0\ \phi = 140^0)$ find 07
i. The spherical coordinates of A;
ii. The Cartesian coordinates of B;
iii. The distance from A to B;
b. Derive expression for electric flux density due to 08
i. Point charge
ii. Line charge

Q.3 a. In free space let $Q_1 = 10nC$ *be at* $P_1(0,-4,0)$ and$Q_2 = 20\ nC$ *be at* $P_2(0,0,4)$ 07
i. Find E at origin
ii. Where should a $30nC$ point charge be located so that E=0 at the origin
b. A charge of $-0.6\mu C$ is located at A(25, -30,25) and a second charge of $0.7\mu C$ *is at* $B(-12,9,14)$. $find\ \boldsymbol{E}\ at\ origin$ 08

Q.4 a. Two uniform line charges $18nC/m$ each are located at x=1, z=2 and at x=-1, y=2 in free space. If the potential at the origin is 200 V find V at P(4,1,3) 07
b. Calculate the work done in moving a 12C charge from B(2,3,5) to A(4,6,9) in the electric field $15x^2a_x + 15y\ a_y \quad V/m$ 08

Q.5 a. Given the potential $V = 200(x^2 - y^2)$*and a point* $P(2,-1,3)$ that is stipulated to lie on a conductor free space boundary. Find $V, \overline{E}, \overline{D}$ *and* ρ_s*at point* p. 07
b. A point charge $Q = 220nC$ is at the origin in free space. Find electric flux density at P(1,0,1) 08

Section B

Q.6 Solve any two 10

i. Discuss Lorentz force equation
ii. Explain Biot Savart Law
iii. Explain significance of loss tangent

Q.7 a. A current filament carries a current of 10A in the a_z direction on the z axis 07
Find the magnetic field intensity $\bar{H}$ in Cartesian coordinates at a point $P(1,2,3)$ due to this filament if it extends from
i) z=0 to 6 m
ii) z= 12 to infinity

b. Region 1 is a semi-infinite space in which $2x - 5y > 0$ while region 2 is defined by $2x - 5y < 0$ 08
Let $\mu_{R1} = 2, \mu_{R2} = 6,\ H_1 = 10\ a_z\ A/m$
Find a) $|B_1|$
b) $|B_{N1}|$
c) H_{t1}
d) $|H_2|$

Q.8 a. The displacement current density is $15\cos(2 \times 10^8 t - k\,z)\,a_x\ \mu A/m^2$ in a material for which $\sigma = 0,\ \varepsilon_r = 5,\ \mu_r = 4$. Find D and E 07

b. Using Amperes circuital Law find $\bar{H}$ due to infinitely long straight conductor along the z axis 08

Q.9 a. A 8375MHz uniform plane wave is propagating in polyethylene with $\varepsilon_r = 2.26, \mu_r = 1$ 07
If the amplitude of electric field intensity is 500 V/m and the material is assumed to be lossless
Find
i. Phase constant
ii. Wavelength
iii. Velocity
iv. Intrinsic impedance
v. Propagation constant

b. Derive the equation of total power in a uniform plane wave by Poynting theorem 08

Q.10 a. Write short note on Stokes theorem 07

b. Derive the equation of reflection coefficient when the uniform plane wave is incident on boundary between regions composed of two different material 08

Total No. of Printed Pages:03

SUBJECT CODE NO:- H-267
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E. (EC/ECT/IEC/E&C)
Feedback Control System
(REVISED)

[Time: Three Hours] **[Max. Marks: 80]**

Please check whether you have got the right question paper.

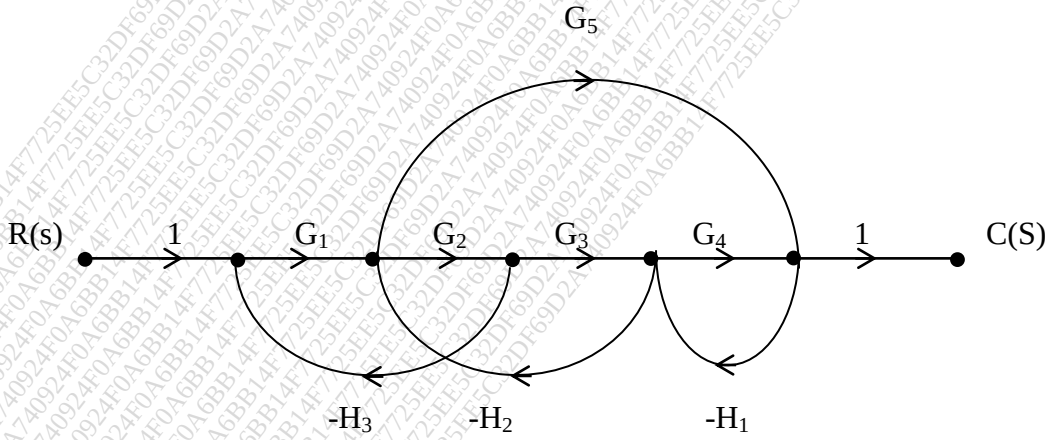
N.B
i) Q.No.1 from section A and Q.No.6 from section B are compulsory.
ii) Attempt any two questions from the remaining questions in each section A /B.
iii) Assume suitable data if necessary.
iv) Number indicate in right side indicate full marks.

Section A

Q.1 Solve any two questions. 10
1) Explain Hydraulic system.
2) Explain signal flow graph rules.
3) What is feed forward control system.

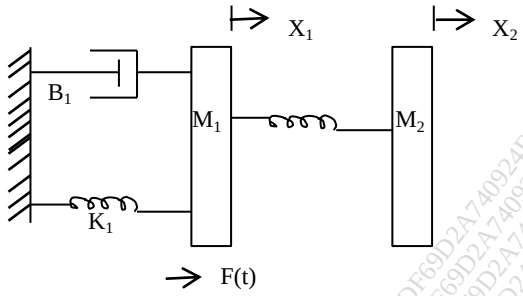
Q.2 a) Explain closed loop and open loop system with two examples each. 08

b) Obtain Transfer function of given figure. 07



Q.3 a) What is position, velocity and acceleration error constant, for a system. 07
$G(s).H(s) = \frac{k}{s^2(s+2)(s+3)}$. Find the value of K to limit the steady state error.

b) For the mechanical system shown in fig. 08
   i) Draw the mechanical network.
   ii) Write the differential equation of performance.
   iii) Draw force – voltage analogue.



Q.4 a) Explain time domain specifications. 07

b) For a system $G(s).H(s) = \frac{20\,(s+2)}{s^2(s+1)(s+5)}$ determine type of system and steady state error for input $1 + 3t + t^2/2$. 08

Q.5 Write a short notes on (Any three) 15

1) Block diagram reduction rule.
2) DC servomotor
3) Synchro transmitter and Receiver
4) Force – voltage analysis .
5) Pneumatic system.

Section B

Q.6 Solve any two : 10

1) What is meant by controlability.
2) What are the disadvantages of Hurwitz stability criteria.
3) How stability is defined based on information of gain & phase margin .Define Gain phase and margin

Q.7 a) Determine the stability of 08
$s^6 + 2s^5 + 3s^4 + 12s^3 + 20s^2 + 16s + 16$ using R-H criterion

b) Explain different types of stability system. 07

Q.8 a) Draw the bode plot for follow. And determine gain & phase margin 15

$G(s).H(s) = \frac{10(s+10)}{s(s+2)(s+5)}$

Q.9 a) Sketch the Nyquist diagram of the unity feedback system where 08

$G(s) = \frac{s+2}{s^2}$

b) Evaluate controllability and observability of the system represented in state space model with 07

$A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 0 & -2 & -3 \end{bmatrix}$ and $B = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$ & $C = \lceil 3 \quad 4 \quad 1 \rceil$

Q.10 Write a short notes on (Any three) 15

1) Root locus design steps.
2) Relays
3) PID controller
4) Fuzzy logic control system
5) Polar plots

Total No. of Printed Pages:02

SUBJECT CODE NO: H-351
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E. (ECT/E&C)
Digital Communication
(REVISED)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B 1) Q. No. 1st and Q. No. 6 are compulsory.
2) Solve any two Questions from the remaining Questions in both sections.

SECTION – A

Q.1 Attempt any two 10

1. Define the process of Quantization. Explain in brief about uniform quantization.
2. What is aliasing effect? What are the remedies available to avoid aliasing effect?
3. What is aperture effect? How it can be reduced.

Q.2 a) State and prove sampling theorem for low pass signal. 08

b) Discuss in brief about natural, flat top and ideal sampling. 07

Q.3 a) A flat top sampling system samples a signal of maximum 1.2 Hz with 2.7 Hz sampling frequency. The duration of the pulse is 0.21sec. Calculate amplitude distortion due to aperture effect at highest signal frequency. 08

b) Define companding. Give the compressor characteristic along with different types. 07

Q.4 a) What is Delta modulation? Explain in terms of features, drawbacks and application. 07

b) Explain PCM system in detail. 08

Q.5 Write short note on 15

1. PPM
2. Quantization Noise
3. Random Variables and Stochastic Process.

SECTION – B

Q.6 Solve <u>any two</u> 10

1. How PN sequence is related with spread spectrum technique/ Explain in brief.
2. What is raised cosine spectrum in digital communication system.
3. Explain frequency shift keying in detail.

Q.7 a) For the input binary sequence $b(k) = \{1, -1, 1, -1, -1, -1, 1, 1, 1\}$, find the transmitted phase sequence and sketch the transmitted waveform for QPSK. 08

b) What is meant by process gain, jam margin, J/S rution and antijam margin? Explain their importance in Spread spectrum communication system. 07

Q.8 a) What do you mean by white Gaussian noise/ what is mathematical expression, effect and PDF curve? 07

b) Calculate impulse response of Matched filter. 08

Q.9 a) What is MSK, explain with waveform representation. 08

b) Explain DPSK generation and detection 07

Q.10 Write short note on: 15

1. ASK, FSK, PSK comparison
2. Optimum filter
3. FHSS technique

Total No. of Printed Pages:2

SUBJECT CODE NO: H-420
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E. (EC/ECT/IEC/E&C)
Digital Signal Processing
(REVISED)

[Time: Three Hours] **[Max.Marks: 80]**

Please check whether you have got the right question paper.

N.B
i) Q. No. 1 & Q. No. 6 are compulsory from each section A and B respectively
ii) Solve any two questions from Q. No. 2 to Q. No. 5
iii) Solve any two questions from Q. No. 7 to Q. No. 10
iv) Figure to the right indicate full marks
v) Assume suitable data if necessary

Section A

Q.1 Attempt any two of the following 10
a) Differentiate between DFT & DTFT
b) What is aliasing? How do we avoid aliasing?
c) Overview of signals & system
d) Relation between Laplace and Z- transform

Q.2 a) Determine the cross correlation of sequences 08

$x(n) = \{---, 0, 0, 2, -1, 3, 7, \underset{\uparrow}{1}, 2, -3, 0, 0 - --\}$

$y(n) = \{---, 0, 0, 1, -1, 2, -2, \underset{\uparrow}{4}, 1, -2, 5, 0, 0 - --\}$

b) Find auto-correlation of $x(n) = \{1, 3, \underset{\uparrow}{4}, 2\}$ 07

Q.3 a) State and prove any two properties of Z-transform 07

b) Determine the Z-transform of the following signals 08
i) $x_1(n) = \{1, 2, 5, 7, 0, 1\}$
ii) $x_2(n) = \{2, 4, 5, 7, 0, 1\}$
iii) $x_3(n) = \delta(n)$
iv) $x_4(n) = \delta(n - k), k > 0$

Q.4 a) Find the Fourier transform of the signal 08
$x(n) = a^n u(n) - 1 < a < 1$ and its magnitude response for $a = .9$

b) State and explain properties of DFT 07

Q.5 a) Explain fast convolution techniques overlap add method 07

b) Find the IDFT of the given DFT 08

i) $x(k) = \{2,1 + j, 0,1 - j\}$

ii) $x(k) = \{2,2 + 2j, -2,2 - 2j\}$

Section B

Q.6 Attempt any two of the following 10

a) Warping effect

b) IIR filter designed by approximation of derivatives

c) Magnitude and phase response of digital filters

d) Product quantization error

Q.7 a) Convert the analog filter into digital filter whose system function is 08

$H(s) = \frac{s+0.2}{(s+0.2)^2+9}$ $Ts = 1\ sec$

Using impulse invariant

b) Explain structure of realization of IIR system 07

Q.8 a) Explain FIR window filter design by hamming window also draw magnitude & phase plot for LPF using hamming window 07

b) Design a FIR high pass filter to meet the following specifications cutoff frequency = 250H_z sampling frequency=fs=1 KH_z and filter Length=7 08

Q.9 a) Explain limit cycle oscillation in recursive system 07

b) Explain Gibbs phenomenon in detail 08

Q.10 a) Design a linear phase FIR filter using Hanning window for the following desired frequency response 08

$$H_d(w) = \begin{cases} e^{-izw} & , \frac{\pi}{4} \leq |w| \leq \pi \\ 0 & \text{otherwise} \end{cases}$$

b) Explain concept of frequency wrapping in IIR filter design 07

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SUBJECT CODE NO:- H-385
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E. (EC/ECT/IEC/E&C)
Analog Integrated Circuit & Applications
(REVISED)

[Time: Three Hours] **[Max. Marks:80]**

Please check whether you have got the right question paper.

N.B
i) Q. No 1 & Q. No 6 are compulsory.
ii) Solve any two questions from Q.2 to Q.5
iii) Solve any two questions from Q.7 to Q.10
iv) Assume suitable data if necessary.

Section A

Q.1 Attempt any two 10
1) Give pin description IC(74) op amp. What are its specifications.
2) Explain voltage to current converter.
3) Explain differentiator using op-amp.
4) Example sample and hold circuit.

Q.2 a) Write neatly about packaging types of IC. 07

b) What are different measurement parameters of IC(74)? State their typical values. 08

Q.3 a) With the help of neat circuit diagram, explain analog multiplier 07

b) Explain voltage follower with neat circuit diagram. 08

Q.4 a) Explain working of triangular wave generator with its wave form 07

b) Draw and explain window detector. 08

Q.5 a) Explain comparator with its characteristics 07

b) How noise and frequency compensation is achieved in op-amp? 08

Section B

Q.6 Attempt any two 10
1) Explain Bi-quad filter.
2) Explain transient response of PLL.
3) What are basics of voltage regulator.
4) Explain adjustable regulator using LM317.

Q.7	a)	Design first order high pass filter with cut off frequency of 10KHZ and pass band gain of 2	08
	b)	Explain Major building blocks of PLL.	07
Q.8	a)	Draw and explain Functional block diagram of IC 723 regulator.	07
	b)	Draw and explain universal switching regulator using IC 78540	08
Q.9	a)	Explain following terms of PLL 1) Free running frequency . 2) Lock range. 3) Capture range.	07
	b)	Explain second order Butterworth low pass filter.	08
Q.10	a)	What is voltage controlled oscillator ? Explain block diagram of IC566	07
	b)	What are advantages of active Filter? Explain band pass filter with circuit diagram.	08

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-105
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E. (EC/ECT/IEC/E&C)
Power Electronics
(REVISED)

[Time: Three Hours] **[Max.Marks: 80]**

Please check whether you have got the right question paper.

N.B
1. Q.1 & Q.6 are compulsory.
2. Solve any two questions from Q.2 to Q.5 &also any two questions from Q.7 to Q.10.
3. Assume suitable data, if necessary.

Section A

Q.1 Solve any two: 10

i) Step-down cycloconverter
ii) Power SCR.
iii) Comparison between R & RC triggering.
iv) Power factor improvement of converter.

Q.2 a) Explain V-I characteristics of TRIAC. 07
b) Explain turning ON & OFF method of SCR with figure. 08

Q.3 a) Explain the effect of source impedance of converter. 07

b) Explain working of EAC (Excitation Angle Control) mtd. For power factor improvement of converter with fig & waveform. 08

Q.4 a) Explain working principle of IGBT with neat diagram & waveform. 07
b) Draw & explain all A to F Class commutation techniques in detail. 08

Q.5 a) An AC voltage controller has resistive load of $R = 10\Omega$, RMS i/p voltage $V_s = 230\ V$, 50 Hz. The SCR are switched ON for $n = 25, m = 75$. Determine 07
i) RMS o/p voltage
ii) i/p power factor
iii) Average & RMS current rating.

b) A three phase half wave converter is operated from a 3Ø Y-connected 220V, 50Hz supply & load resistant $R = 10\Omega$. If the average o/p voltage is 25% of maximum possible average vlg. Determine 08
i) Delay angle
ii) RMS & average o/p current
iii) Average & RMS thyristor current
iv) Rectifier efficiency
v) Transformer utilization factor
vi) i/p power factor.

Section B

Q.6 Solve any two: 10

i) Source filter
ii) Servo controlled voltage stabilizer
iii) SCR Ring Counter
iv) Performance parameter of inverter

Q.7 a) What are the voltage control techniques of an inverter? Also explain why voltage control is essential? 08

b) Find out the o/p frequency and attenuation factor of series inverter circuit having following data: $L = 10mH, C = 0.14\mu f, R_L = 0.4K\Omega, to_{ff} = 0.2ms$. 07

Q.8 a) Derive an expression for Io_{max}&Io_{min} for Class 'A' chopper. 08

b) A DC chopper (step down) has 'R' load $R = 10\Omega$, i/p voltage$V_s = 200V$. When chopper remains ON, its voltage drop is 2V. chopper frequency is 1KHz. If the duty cycle is 50% determine. 07
i) Average o/p voltage
ii) RMS o/p voltage
iii) Chopper efficiency
iv) Effective i/p resistance.

Q.9 a) For the type 'A'- chopper $V_s = 220V, F = 500\ Hz, T_{ON} = 800\ \mu\ sec, R = 1\Omega, L = 1mH,$ $E = 72V$; find 08
i) Whether I_L is continuous or not
ii) Compute I_{max}&I_{min}.

b) Comparison between 180^0& 120^0 conduction mode of 3Ø inverter. 07

Q.10 a) Draw & explain voltage commutation chopper with waveform & design consideration. 08
b) Draw & explain series inverter with waveform in detail. 07