Total No. of Printed Pages:1

SUBJECT CODE NO:- H-1467
FACULTY OF SCIENCE AND TECHNOLOGY
T.Y. B.Tech. (ETC) (Sem-VI)
Digital Image Processing
[Revised]

[Time: Two Hours] **[Max. Marks:40]**

Please check whether you have got the right question paper.
N.B.: 1) Question No.1 from Section A & Question No.5 from section B is compulsory.
2) Two questions from remaining questions from sections A & B each.

Section – A

Q.1 Solve any three questions 06
(a) What is histogram?
(b) Represent an image in matrix form
(c) Write the equations for image negative & log transformations.
(d) What are transforms?
(e) Define sampling & quantization.

Q.2 With the help of a neat diagram explain fundamental steps in digital image processing. 07

Q.3 Explain smoothing & sharpening filters of frequency domain. 07

Q.4 Explain the properties of fourier transform 07

Section – B

Q.5 Answer any three questions: 06
(a) Define thresholding
(b) What is the difference between CMY & CMYK Models?
(c) What is Hue & Saturation in HIS colour Model?
(d) What is image Restoration?
(e) List types of segmentation. Define Robert's operator.

Q.6 Explain image Degradation model with the help of a neat diagram & mathematical equation? 07

Q.7 Describe different segmentation techniques based on similarities. 07

Q.8 What are the different colour models used in image processing? Explain Y CbCr colour model in detail. 07

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H-420

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-420
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (EC/ECT/IEC/E&C) (Sem-I)
Digital Signal Processing
[OLD]

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

Please check whether you have got the right question paper.

N.B.: 1) Question No. 1 and 6 are compulsory.
2) Answer any two questions from Q. No. 2 to Q. No. 5 from Section A.
3) Answer any two questions from Q. No. 7 to Q. No. 10 from Section B.
4) Numbers shown in the right side indicates full marks.
5) Assume suitable data if necessary.

Section -A

Q.1 Answer the following questions in brief (any five): 10

a) Draw a typical discrete time signal for $x(n) = n.u(n)$
b) Define correlation.
c) What is relation between Fourier transform and Z-transform?
d) What is Z-transform of the signal expressed as $y(n) = n.a^n .u(n)$?
e) What is meant by rational Z-transform?
f) State any two properties of DFT – transform.
g) What is an overlap-add method?
h) What is twiddle factor?

Q.2 a) Find the convolution of the following two signals: 07
$x(n) = u(n) - 3u(n-2) + 2u(n-4)$ and $h(n) = u(n+1) - u(n-3)$

b) Determine the stability in z-domain for the following: 08
$X(z) = \frac{0.5-0.4z^{-1}+0.06z^{-2}}{2+1.6z^{-1}+0.64z^{-2}}$

Q.3 a) Determine the z-transform of following signals: i) $x(n) = n^2u(n)$ and 07
ii) $(n) = n.a^nu(n)$, where , u(n) is unit step signal and 'a' is a constant.

b) Explain Decimation – In- time (DIT) algorithm for FFT with the help of butterfly structure and mathematical equations involved in it. 08

Q.4 a) Find the inverse Z-transform of $X(z) = \frac{3+2z^{-1}+z^{-2}}{1-3z^{-1}+2z^{-2}}$ using partial fraction expansion method. 07

b) Find the DFT of a sequence x(n)={1,2,3,4} using basic DFT algorithm. 08

Q.5 a) Let x(n) is a discrete time signal with N_1 samples and y(n) is a discrete time signal with N_2 samples. Explain the procedure for evaluating the correlation of these two signals. 07

b) Write short note on- Computation of inverse DFT using FFT. 08

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Section- B

Q.6 Answer the following questions in brief (any five): 10

a) How will you choose order *N* for a Butterworth filter?
b) What is meant by pass band ripple?
c) State typical mapping used(s-plane to z-plane) in Bilinear Transformation.
d) State Gibb's phenomenon.
e) State any two differencing point between IIR and FIR filters?
f) Write a mathematical expression for Bartlett window.
g) What is meant by quantization by truncation?
h) Define-product quantization error.

Q.7 a) Explain the concept of Coefficient Quantization Error with typical examples. 07

b) Determine the Direct Form-I and Direct Form-II realizations of 08

$$H(z) = \frac{0.44z^{-1}+0.362z^{-2}+0.02z^{-3}}{1+0.4z^{-1}+0.18z^{-2}-0.2z^{-3}}$$

Q.8 a) Explain the design steps for designing a digital Butterworth filter using the Impulse Invariant Transformation method. 07

b) Design a low-pass FIR filter using frequency sampling method for having cutoff frequency of $\frac{\pi}{2}$ rad/sample. The filter should have linear phase and length of 17. 08

Q.9 a) Write a short note on – digital frequency transformation. 07

b) What are the ideal filter requirements? Draw the magnitude responses of four ideal classical types of digital filters and explain it for ideal low pass filter. 08

Q.10 a) Explain about limit cycles in recursive systems in detail. 07

b) Explain the design of a low-pass FIR filter using windowing techniques. Also, state the mathematical expressions for different window functions. 08

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Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1018
FACULTY OF SCIENCE AND TECHNOLOGY
T.Y.B.Tech. (ETC) (Sem VI)
Information Theory & Coding
[OLD]

[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) Q. No.2 to 5 and Q.No.7 to 10 solve any two questions from each section.

Section A

Q.1 Attempt any five: 10
(a) Define mutual information.
(b) Write relationship between probability and information.
(c) Explain binary symmetric channel.
(d) State information capacity theorem.
(e) What is BCH code?
(f) What is state table?
(g) What is source coding theorem?

Q.2 (a) Perform Shannon fano coding for {1/2, 1/8, 1/8, 1/16, 1/16, 1/32, 1/32}. Also find efficiency. 08
(b) Explain average mutual information and entropy. 07

Q.3 (a) Explain channel model with its block diagram. 08
(b) Consider a DMS with seven possible symbols x_i $i = 1, 2, \ldots\ldots\ldots, 7$ and corresponding probabilities $p(x_1) = 0.37, p(x_2) = 0.33, p(x_3) = 0.16, p(x_4) = 0.07, p(x_5) = 0.04, p(x_6) = 0.02, p(x_7) = 0.01$. Find the entropy and average no. of binary digit per symbol. 07

Q.4 (a) Explain channel coding in detail. 08
(b) Describe Hamming code with an example. 07

Q.5 (a) Explain source coding theorem in detail. 08
(b) Explain channel capacity for MIMD system. 07

Section B

Q.6 Attempt any five: 10
(a) What is shortened cycle code?
(b) Determine that given code is cyclic code or not?
C={000, 010, 011, 111}
(c) What is BCH code?
(d) What is cryptography?
(e) What is cipher text?
(f) Explain burst error correction.
(g) Explain Golay code with an example.

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Q.7	(a)	For cyclic code (7,3). Find generator polynomial and check whether received codeword is correct or not 1011101.	08
	(b)	Explain symmetric and asymmetric cryptography.	07
Q.8	(a)	Find the equivalent codeword for message 1010 for $g(x) = x^3 + x + 1$ and also draw cyclic encoder.	08
	(b)	Explain RSA algorithm.	07
Q.9	(a)	Explain Trellis codes with an example.	08
	(b)	Explain transposition cipher.	07
Q.10	Write short note on:		15
	(a)	Viterbi decoding	
	(b)	Process of encryption and decryption	
	(c)	Biometric encryption	

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Total No. of Printed Pages:02

SUBJECT CODE NO:- H-1043
FACULTY OF SCIENCE AND TECHNOLOGY
T.Y. B.Tech. (ETC) (Sem-VI)
Antenna Theory
[Old]

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

Please check whether you have got the right question paper.

N.B
1) Answering of question no. 1 and 6 are compulsory.
2) Answer any two questions from question no 2, 3, 4 & 5 from section A and answer any two questions from question no 7, 8, 9, & 10 from section B.
3) Assume suitable data if necessary.

Section A

Q.1 Answering any five from the following: 10
a. Define Beam width and Bandwidth.
b. Draw radiation pattern of end fire array.
c. Write advantages of folded dipole antenna.
d. Radiation resistance of half wave dipole antenna is ____
e. List various excitation methods of antenna.
f. State FRIIS formula.

Q.2
a) A thin dipole antenna $\lambda/15$ long. If its resistance is 1.5Ω . Find radiation resistance and efficiency. 06
b) An antenna has radiation resistance of 72Ω , load resistance of 8Ω and power gain of 12 dB. Find its directivity and antenna efficiency. 06
c) Describe self and mutual impedance. 03

Q.3
a) Derive radiated field equation for infinitesimal dipole. 09
b) Describe ground and earth curvature effect for circular loop. 06

Q.4
a) Prove that side lobe ration of uniform array is -13.47. 06
b) Compare broadside array and end fire array. 06
c) Mention different impedance matching techniques. 03

Q.5 Write short note on. 15
a) Finite length dipole
b) Binomial array
c) Reciprocity theorem.

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Section B

Q.6	Answer any five from the following:		10
	a)	Define frequency independent antenna.	
	b)	State application of log periodic antenna	
	c)	How circular polarization is achieved in patch antenna?	
	d)	What is specialty in multimode horn antenna?	
	e)	Draw diagram of smart antenna.	
	f)	List out types of reflector antenna.	
Q.7	a)	Write design steps of log periodic antenna explain with example.	09
	b)	Describe rectangular patch antenna.	06
Q.8	a)	Draw pyramidal horn antenna explain its construction, working, advantages and applications.	08
	b)	Draw E plane sectoral horn and write its radiated field equation. Explain its working.	07
Q.9	a)	Describe parabolic reflector antenna used at microwave frequency.	07
	b)	A 64 meter diameter parabolic reflector is fed by a non-directional antenna at1430 MHz. Calculate HPBW, FNBW and power gain with reference to dipole of half wavelength.	06
	c)	List out feed method for parabolic reflector.	02
Q.10	Write short note on.		15
	a)	Yagi uda antenna	
	b)	Corrugated Horn	
	c)	Corner reflector	

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Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1069
FACULTY OF SCIENCE AND TECHNOLOGY
T.Y.B.Tech. (ETC) (Sem VI)
VLSI Design
(OLD)

[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. Solve any two questions from the remaining questions in each section

Section A

Q.1	Attempt any five question		10
	a)	What is CAD?	
	b)	What is Sensitivity list?	
	c)	Write syntax of entity declaration	
	d)	What is VHDL?	
	e)	Write VHDL code for half substractor	
	f)	Enlist types of delays in VHDL	
Q.2	a)	What is an architecture? Describe it with one example	08
	b)	Write VHDL code for full adder.	07
Q.3	a)	Write VHDL code for 8:3 encoder.	08
	b)	Write a note on data types	07
Q.4	a)	Give syntax of case statement and explain with one example	08
	b)	Write VHDL code of flip flop	07
Q.5	a)	Which operators are used in VHDL	08
	b)	Write a note on functions in VHDL	07

Section B

Q.6	Attempt any five question		10
	a)	What is Moore machine?	
	b)	What is a stick diagram?	
	c)	Why there is need at testability?	
	d)	Enlist synthesis tools	
	e)	Draw state diagram of to flip flop	
	f)	What is fault coverage	
Q.7	a)	Describe architecture of CPLD	08
	b)	Write a note on optimization process	07
Q.8	a)	With the help of appropriate diagram describe mealy machine	08

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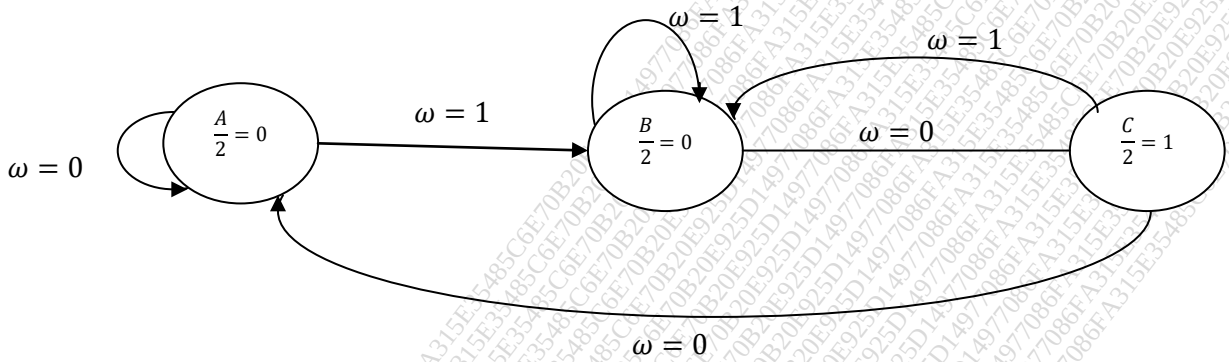
b) What is boundary scan? 07

Q.9 a) Describe synthesis process 08

b) Draw and explain architecture of FPGA 07

Q.10 a) What is Simulation? Explain it in detail with its types 08

b) Draw ASM chart for 07



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Total No. of Printed Pages:01

SUBJECT CODE NO:- H-1152
FACULTY OF SCIENCE AND TECHNOLOGY
T.Y. B.Tech. (ETC) (Sem-VI)
Electronics Measurement
[Old]

[Time: Two Hours] **[Max. Marks: 40]**

Please check whether you have got the right question paper.

N.B
1) Question no. 1 from Section A & Question no.5 from Section B are compulsory.
2) Solve any two questions from remaining questions of Section A & B each.
3) Figure to the right indicates full marks.

Section A

Q.1 Attempt any three from the following: 06

a) Define precision, accuracy, sensitivity, resolution.
b) Compare primary & national standards.
c) What are the precaution to be taken while using voltmeter?
d) State the uses of oscilloscope.

Q.2 A set of independent voltage measurements taken by four observers was recorded as 117.02V, 117.11V, 117.08V and 117.03V. 07
Calculate:- 1) The average voltage 2) Range of error

Q.3 How the TVM works, why does a TVM uses FET as input stage transistor? 07

Q.4 With neat block diagram describe the working of a DSO. 07

Section B

Q.5 Attempt any three from the following:- 06

a) Enlist the standard specifications of signal generator?
b) What are the different types of bridges?
c) What is Q-meter?
d) What is wave analyzer, what are the applications of it?

Q.6 Draw the neat block diagram of function generator and explain in detail? 07

Q.7 With the principle of working. Explain stroboscope, give its applications? 07

Q.8 What is distortion, also define Harmonic distortion. Explain Harmonic distortion analyzer with the help of block diagram? 07

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Total No. of Printed Pages:03

SUBJECT CODE NO:- H-1177
FACULTY OF SCIENCE AND TECHNOLOGY
T.Y. B.Tech. (ETC) (Sem V)
Control System
[Old]

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

Please check whether you have got the right question paper.

N.B
i. Question No. 1 and Question No. 6 are compulsory. Attempt any two of the following from the remaining in each section.
ii. Assume suitable data, if necessary.
iii. Figure shown in right side indicates full marks.

Section A

Q.1 Answer any two of the following in brief: 10

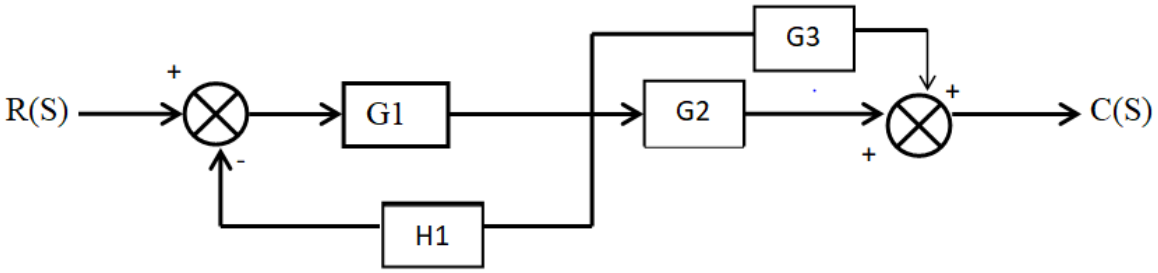
a) The transfer function of a system is given below.

$$G(S) = \frac{8(S+3)(S+4)}{S(S+2)^2\,(S^2+2S+5)}$$

Determine the poles & zero and show the pole-zero configuration in S-plane

b) The impulse response of a system is given by $g(t) = e^{-t}(1-\cos 2t)$ determine the transfer function of the system.

c) Draw signal flow graph for the Block diagram & find transfer function using Mason's gain formula.



Q.2 a) Derive the expression for under- damped response of the second order system subjected to unit step input i.e. $C(t) = 1 - \frac{e^{-\xi wnt}}{\sqrt{(1-\xi^2)}} \sin\left(\left(w_n\sqrt{(1-\xi^2)}\right)t + \tan^{-1}\frac{\sqrt{1-\xi^2}}{\xi}\right)$ 08

b) Draw a root locus for the given expression of open loop transfer function $G(S)\,H(S) = \frac{K}{S(S+2)\,(S+4)}$ 07

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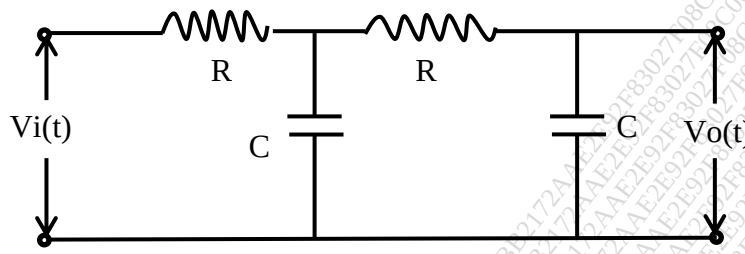
Q.3 a) Find out the transfer function of given electrical network: 08



b) The overall transfer function of a unity feedback control system is given by 07

$$\frac{C(S)}{R(S)} = \frac{10}{S^2 + 6S + 10}, Find\ Kp, Kv, Ka$$

Q.4 a) State Hurwitz criteria? What are the advantages & Hurwitz criteria? Find the no. of roots in the right half of S-plane using Routh's criterion, for the characteristics equation given below. 08

$$S^5 + S^4 + 2S^3 + 2S^2 + 3S + 5 = 0$$

b) What are feedback and feed forward control system? Explain with neat block diagram. 07

Q.5 Write a short note on any three of the following: 15

a) Characteristics equation.
b) RLC network analysis.
c) Time-domain stability analysis method.
d) Special cases of R-H criteria.

Section B

Q.6 Answer any two of the following in brief 10

a) Give the constructional details of DC servomotors.
b) Bring out the co-relation between time domain and frequency domain specifications.
c) What are the advantages of state space analysis over conventional control system analysis method?

Q.7 a) What PLC? Explain the detailed block diagram of PLC & give it's specifications 08

b) Obtain the state transition matrix for the system 07

$$\begin{bmatrix} \dot{x_1} \\ \dot{x_2} \end{bmatrix} = \begin{bmatrix} -3 & 1 \\ 0 & -1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

Q.8 a) A unity feedback system, $G(S) = \frac{800(S+2)}{S^2(S+10)(S+40)}$ Sketch the Bode plot. Comment on stability 10

b) Obtain the solution for state matrix equation. 05

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Q.9

a) For a unity feedback system, $G(S) = \frac{80(S+2)}{S^2(S+10)(S+40)}$ sketch the Nyquist plot & comment on close loop stability. 10

b) State and explain the role of actuator in control system. Give the different types of actuations. 05

Q.10 Write short note on any three of the following: 15

a) PID controller
b) Pulse transfer function
c) Concept of state, state variable and state space
d) Lead & lag network in frequency domain analysis

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Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1198
FACULTY OF SCIENCE AND TECHNOLOGY
T.Y. B.Tech. (ETC) (Sem-V)
Microprocessors & Peripherals
[Old]

[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 remaining in each section.
iii) Assume suitable data if necessary.

Section A

Q.1 **Answer any FIVE of the following:** 10

(a) List the flags of 8085.
(b) Describe the function of ALE & HOLD pins of 8085.
(c) List any four features of 8085.
(d) Enlist different data transfer schemes of microprocessor.
(e) Enlist the modes of 8253 timer.
(f) Explain why data lines & address lines are multiplexed in 8085.

Q.2 a) Draw the functional architectural diagram of 8085. Briefly explain the function of each block. 08

b) Explain the different addressing modes of 8085 with example. 07

Q.3 a) Draw the timing diagram of MVIr 08

b) Enlist the features of 8255 07
Explain BSR mode of 8255.

Q.4 a) Write assembly language program to add two 16 bit numbers. The first number is stored in memory location 7100H and 7101 H. The second number in memory location 7102 H & 7103 H. Store the result in the memory location 7104 H and 7105 H. 08

b) Interface 8 LED's with 8085 through 8255. Write a program for rolling display. 07

Q.5 **Write a note on any three:** 15

a) Need of I/O ports.
b) Mode-2 and mode-3 of 8253.
c) USART 8251.
d) Interrupts in 8086.

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Section B

Q.6 **Attempt any five of the following:** 10

a) What is MN/$\overline{MX}$ pin of 8086?
b) List the features of 80386 microprocessor.
c) What is instruction queue of 8086?
d) Explain the DIV instruction of 8086.
e) What is the function of SI & DI registers.
f) Differentiate conditional flags & control flags.

Q.7 a) Explain with example various addressing modes of 8086. 07
b) What is pipe lining? How it is achieved in 8086 microprocessor. 08

Q.8 a) Explain with neat diagram architecture of 8086. 08
b) Explain closely coupled configuration of 8086 07

Q.9 a) Enlist the features of Pentium & Pentium pro. 07
b) What is assembler? Explain any five assemblers. 08

Q.10 a) Explain minimum mode configuration of 8086 microprocessor. 08
b) What is the role of IOP 8089 in multiprocessor system? 07

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Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1267
FACULTY OF SCIENCE AND TECHNOLOGY
T.Y.B.Tech. (ETC) (Sem-V)
Electronic Circuit Design Technology
[OLD]

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

Please check whether you have got the right question paper.

N.B
1. Assume suitable data if required
2. Question No.1 and 6 are compulsory
3. Solve any two questions from the remaining section A and Section B each.

Section A

Q.1 Answer the following questions: 10
a) Define Buck converter.
b) What is the need of packaging?
c) List out the features of LM3352.
d) Draw the pin diagram of IC7107
e) What are the applications of PC817.

Q.2 a) Explain the classification of electronic components packages on the basis of shape, size and material. 07

b) Design constant current source using LM1117 for the output current 500MA and load resistance 20Ω. 08

Q.3 a) Design multirange dc voltmeter with internal resistance of R_m=50Ω and I_{fsd}= 50μA for the voltage range $0 - 5V - 15V - 20V - 50V$. 08

b) Design multirange dc ammeter to satisfy following specifications. 07
$R_m = 500\Omega, I_{fsd} = 1mA$
For the current range 0-5mA, 10mA, 50mA ,100mA

Q.4 a) Explain construction and working of dc motor. 08

b) Explain isolation technique using optocoupler PC817. 07

Q.5 Write short note on: 15
a) Design of variable power supply using LM2576
b) Solid state relay
c) Stepper motor

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Section – B

Q.6 Answer the following questions: 10

a) Define ergonomics
b) What is EMI filter?
c) Define relative humidity
d) What are the type of PCB?
e) List out the applications of touch sensor.

Q.7 a) Explain construction and working of capacitive touch sensor. 08

b) What is hygrometer? Explain construction & working of resistive hygrometer. 07

Q.8 a) Explain an electronic product development phases in detail. 08

b) What is selection crieteria for enclosure material selection? 07

Q.9 a) Explain different noise sources in electronics. 08

b) Explain grounding rules in PCB design. 07

Q.10 Write a short note on: 15

a) PCB manufacturing process.
b) Thermal management & its types
c) Accelerometer

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Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1302
FACULTY OF SCIENCE AND TECHNOLOGY
T.Y.B.Tech. (ETC) (Sem-V)
Digital Signal Processing
[OLD]

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

Please check whether you have got the right question paper.

N.B i) Question No.1 and Question No.6 are compulsory from Section A & 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) Assume suitable data if necessary and solve it clearly.

Section – A

Q.1 Attempt any two of the following 10

a) Explain advantages of digital signal processing over Analog signal processing.
b) Describe the relation between Fourier transform and Z-transform.
c) Explain direct form I structure and direct form II structure.
d) Explain Impulse invariance method for IIR filter design.

Q.2 a) Explain structure of realization of FIR systems. 08
b) Determine whether following system is linear or nonlinear and Time invariant or Time variant system. 07
a) $y(n) = x(n-2)$ b) $y(n) = \cos x(n)$

Q.3 a) Compute DFT of sequence $x(n) = \{1,0,0,1\}$ 08
b) Explain the properties of DFT. 07

Q.4 a) For the analog transfer function $HS = \frac{(S+1)}{(S+2)(S+4)}$ determine H(z) using impulse invariant method if; a) T=1 second b) T=0.5 second 08
b) Explain overlap Add method, overlap save method. 07

Q.5 a) Perform the circular convolution of the following two sequence 05
$x_1(n) = \{1,2,3,4\}\ x_2(n) = \{1,2,1,2\}$
b) Compute the eight point DFT of the sequence 10
$x(n) = \begin{cases} 1 & 0 \le n \le 7 \\ 0 & otherwise \end{cases}$
by using the decimation in frequency FFT algorithm.

Section – B

Q.6 Attempt any two of the following. 10
a) Explain multiply accumulate unit of digital signal processor
b) Wrapping effect

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c) Sampling rate conversion by rational factor I/D.
d) Explain frequency sampling method for design of FIR filter.

Q.7 a) Determine the coefficient of a linear phase FIR filter of length M=15 has a symmetric unit sample response and a frequency response that satisfies the conditions 10

$$H\left(\frac{2\,\pi k}{15}\right) = 1; K = 0,1,2,3$$
$$= 0; K = 4,5,6,7$$

b) Explain Quantization effects in Analog to digital conversion of signals. 05

Q.8 a) Explain Hamming window in detail. 08
b) What is FIR? Explain symmetric and Anti symmetric FIR filters 07

Q.9 a) Explain multirate signal processing in detail. 08
b) Explain any one application of DSP in detail. 07

Q.10 a) Explain Architecture of TMS320CS4X in detail. 08
b) Explain product quantization, scaling, quantization Errors in the computation of DFT. 07

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Total No. of Printed Pages:1

SUBJECT CODE NO:- H-1350
FACULTY OF SCIENCE AND TECHNOLOGY
T.Y.B.Tech. (ETC) (Sem -V)
Microelectronics
[OLD]

[Time: Two Hours] **[Max.Marks:40]**

Please check whether you have got the right question paper.

N.B
i) Question No.1 and 4 are compulsory.
ii) Assume suitable data wherever necessary.
iii) Figures to the right indicate full marks.

Section A

Q.1	a) Draw and explain VI characteristics of depletion & enhancement mode MOSFET.	04
	b) List the parameters of MOSFET & explain.	04
Q.2	With neat diagrams explain NMOS enhancement type MOSFET fabrication.	06
	OR	
	What do you mean by thermal aspects of processing on NMOS and CMOS fabrication?	06
Q.3	Write a short note on pass transistor.	06
	OR	
	Derive the relationship between drain to source current & drain to source voltage for linear as well as saturation mode.	06

Section B

Q.4	a) Comment on stick diagrams?	04
	b) Explain delay unit.	04
Q.5	Explain in detail lambda based design rules.	06
	OR	
	What is Super Buffer, where it's used, also give it's advantages?	06
Q.6	Write a note on Latch up in CMOS circuits.	06
	OR	
	Give a case study on half adder circuit using spice circuit simulation.	06

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Total No. of Printed Pages:02

SUBJECT CODE NO:- H-1382
FACULTY OF SCINECE AND TECHNOLOGY
T.Y. B.Tech. (ETC) (Sem-V)
Microprocessors and Microcontroller
(Revised)

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

Please check whether you have got the right question paper.

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

Section A

Q.1 Attempt **any FIVE** of the following 10

a) Why AD_0 to AD_7 lines are multiplexed?
b) Give the function RESET and READY pins of 8085.
c) Give difference between memory mapped I/O & I/O mapped I/O.
d) Give the function of interrupt request register of 8259.
e) What is fully nested mode?

Q.2
a) Draw the timing diagram of ADD M. 08
b) Write a delay subroutine for generating a delay of 0.4 sec. 07

Q.3
a) Write an assembly language program to find smallest number from a block of data. Block of ten numbers are stored from memory location 2200H. 07
b) Interface 7 segment display with 8085 through 8255. And write an ALP for display 0 to 9. 08

Q.4
a) Draw the block diagram of 8255 and explain each block in detail. 08
b) Draw the master slave diagram of 8259 PIC to interface 24 interrupting devices. 07

Q.5
a) With neat waveform explain mode 1 and mode 2 of 8253. 07
b) Explain different data transfer techniques of 8085 in detail. 08

Section B

Q.6 Attempt **any five** of the following 10

a) Give IP=329 CH, physical address=573H calculate segment address.
b) What do you mean by index registers?
c) Draw SCON register of 8051.
d) Enlist any four feature of 8051.
e) What is the reset value of SER's, stack pointers, and ports of 8051
f) Explain direct addressing mode of 8051 with example.

Q.7
a) Draw and explain the architecture of 8086. 08
b) What is memory segmentation? Explain it for 8086. 07

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Q.8	a)	Two 32 bit numbers are stored at Num1 and Num2 respectively. Write an instruction sequence to add these numbers and store it in Num3.	08
	b)	Write ALP to substract the content of two external memory location 7400H and 7401H. Store result at 7402H.	07
Q.9	a)	Explain in detail steps to program timer in mod 2.	08
	b)	Assuming crystal 22MHz write a program to generate a square wave of frequency 1KHz on pin 1. 2. Use timer 0, mode 2.	07
Q.10	a)	Interface LCD 16 × 2 with 8051 and write a program for communicating with LCD using a delay.	10
	b)	Write a 8051 program in C to toggle all the bits of port 1 continuously.	05

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Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1389
FACULTY OF SCIENCE AND TECHNOLOGY
T.Y. B.Tech. (ETC) (Sem-V)
Digital Communication
(Revised)

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

Please check whether you have got the right question paper.

N.B
1. Q.No.1 and Q.No.6 are compulsory.
2. Solve any two questions from remaining questions. (from each section)
3. Assume suitable data wherever is required.

Section A

Q.1 Answer any five: 10

a) State the working principle of DPCM.
b) What are the draw backs of delta modulator?
c) Define Mean & Autocorrelation of a Random Process.
d) State conditional probability.
e) Over a noisy channel 10000 digits are transmitted having a probability of error per digit of 5×10^{-5}. What is the probability of getting only two digits in error?
f) State the Formula for Binomial Distribution.
g) Define:
   i) Random variable.
   ii) Random process.

Q.2 a) Draw and explain block diagram of Adaptive Delta Modulation with its advantages over DM. 08

b) Why delta modulator is called 1-bit DPCM? Explain DPCM with neat block diagram. Give its advantages. 07

Q.3 a) Derive an expression for SNR for PCM system that employs Linear Quantization. Assume that input to the PCM system is sinusoidal. 08

b) State & prove Bayes theorem. 07

Q.4 a) Show that the random process $x(t) = A \cos(w_c t + Q)$ is wide-sense stationary. Here 'Q' is uniformly distributed random variable in the range $[0, 2\pi]$. 08

b) Explain the process of information transmission through discrete communication channel. 07

Q.5 a) A T.V signal with a BW of 4.2 MHz is transmitted using Binary PCM. The no. of Quantization levels is 512. Calculate 08
i) Code word length

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ii) Signaling rate
iii) SNR in dB
iv) Transmission BW

b) State the formula for Poissons Distribution. If 4% of the total items made by factory are defective. Find the probability that less than 2 items are defective in a sample of 50 items. 07

Section B

Q.6 Answer any five: 10

a) Represent ASK mathematically.

b) Define:
i) Processing Gain.
ii) Jamming Margin.

c) State the working principle of PSK.
d) Draw the Graphical Representation of BPSK.
e) State the applications of FHSS.
f) Define split phase Manchester code
g) Define PN-sequence

Q.7 a) Explain BPSK reception with neat block diagram. 08
b) Define ASK, FSK & PSK. Draw their waveforms. 07

Q.8 a) Explain the reception of QPSK with neat diagram. 08
b) Compare Slow and Fast Frequency Hopping. 07

Q.9 a) Encode the following Binary Data Stream 1100110 using 08
i) Polar NRZ
ii) Unipolar RZ
iii) AMI.
iv) Manchester code

b) Explain DSSS in details. 07

Q.10 a) Explain slow Frequency Hopping with neat diagrams. 08

b) The direct sequence spread spectrum communication system has following parameters. Data sequence bit duration $Tb = 4.095\ ms$ 07
PN chip duration = Tc = 1 μ sec, Eb/No= 10 for average prob. of error less than 10^{-5}.
Calculate Processing Gain & Jamming Margin.

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Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1396
FACULTY OF SCINECE AND TECHNOLOGY
T.Y. B.Tech. (ETC) (Sem-V)
Electronic Circuit Design Technology
(Revised)

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

Please check whether you have got the right question paper.

N.B
1. Assume suitable data if required.
2. Questions No.1 and 6 are compulsory.
3. Solve any two questions from the remaining section A and section B each.

Section A

Q.1 Answer the following questions. 10
a) List the features of PC817.
b) Design constant current source using LM317 for the output current 1A
c) Define sensitivity in voltmeter.
d) Design constant current source using LM117 for the output current 200MA.
e) What are the applications of MC3479 IC?

Q.2 a) Design dual dc power supply using 78XX & 79XX series IC for the following specification 08

$$V_o = \pm 5V$$

b) Design fixed dc power supply using LM2576 IC to satisfy following specifications. 07

$$V_o = +12V$$
$$I_L = 1A$$
$$fosc = 52\ KH3$$

Q.3 a) Describe design procedure for basic dc ammeter. 07

b) Design multirange dc voltmeter for the following specifications 08

$$R_m = 50\Omega\,, I_{fsd} = 60\mu A$$

Voltage range = 0-10V, 50V , 100V, 200V

Q.4 a) Describe construction & working of stepper motor. 08

b) Explain relay driver circuit using ULN 2003. 07

Q.5 Write a short note on : 15
a) Solid state relay.
b) Design of digital voltmeter using IC 7107.
c) Servo motor.

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Section – B

Q.6 Answer the following questions: 10

a) Define ground.
b) What is relative humidity?
c) What are the types of PCB?
d) Define sensor.
e) What is noise?

Q.7 a) Explain construction and working of resistive touch sensor. 08

b) Describe construction and working of PIR sensor. 07

Q.8 a) Explain various types of noise sources in detail. 08

b) Explain common mode & normal mode noise in detail. 07

Q.9 a) Explain PCB manufacturing process in detail. 08

b) Explain grounding rules in PCB design. 07

Q.10 Write a short note on: 15

a) Gyroscope.
b) Noise reduction techniques.
c) PCB design rules for digital circuits.

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Total No. of Printed Pages:02

SUBJECT CODE NO:- H-1403
FACULTY OF SCINECE AND TECHNOLOGY
T.Y.B.Tech. (ETC) (Sem-V)
Digital Signal Processing
(Revised)

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

Please check whether you have got the right question paper.

N.B
i. Question 1 and 6 are compulsory.
ii. Solve any two questions from each section.
iii. Assume suitable data if necessary.

Section A

Q.1 Attempt any five from the following: 10

a) State any two advantages of DSP over ASP.
b) Write twiddle factor matrix four point IDFT.
c) Explain bin spacing of DFT.
d) Write the name of the structures used to realize IIR systems.
e) Write the equation of IDFT with and without Twiddle factor.
f) Find 2 point DFT of $x(n) = \{1,1\}$.

Q.2 a) Realize direct form I OR Direct form II of 08

$$y(n) = 5y(n-1) - 2y(n-1) + 3y(n-3) + x(n) - 2x(n-2)$$

b) What are the different types of structures of IIR system realization? Explain any one form. 07

Q.3 a) Find 8 point DFT by using radix-2 DIT method, where $x(n) = \{1,0,0,1\}$ 07
b) Find circular convolution by using matrix method. 08

$$x(n) = \{0,1,2,3\}$$
$$h(n) = \{2,1,1,2\}$$

Q.4 a) Explain the properties of FIR filter in detail. 07
b) Explain the design procedure of FIR filter by using rectangular window. 08

Q.5 Solve any three of the following: 15

a) Explain the linearity property of DFT.
b) Calculate DFT if $x(n) = \{1,2,3,4\}$
c) Explain overlap add method in detail
d) Explain the twiddle factor concept for DFT & IDFT of 2-point & 4-point calculation.

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Section B

Q.6 Answer any five of the following: 10

a) How the s-plan is mapped to z-plane in approximation of derivatives?
b) Explain interpolation by using block diagram.
c) Write the features of DSP processor.
d) Explain he mapping of impulse invariance method.
e) Explain any two properties of Butterworth filter.
f) What is pre-warping procedure?

Q.7 a) Explain the design of IIR filter by approximation of derivatives. 08
b) Use approximate of derivatives method to design digital IIR filter if the analog system function is $h(s) = \frac{1}{s+1}$ 07

Q.8 a) Explain product quantization, scaling, quantization error in computation of DFT. 08
b) Explain fixed point number, floating point number representation. 07

Q.9 a) Draw & explain architecture of $TMS320C67 \times\times$. 08
b) Compare between general purpose processor and DSP processor. 07

Q.10 a) Explain bilinear z-transform method for the designing of IIR filter. 07
b) Explain the advantages & disadvantages of digital filter. 08

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H-1410

Total No. of Printed Pages:3

SUBJECT CODE NO:- H-1410
FACULTY OF SCINECE AND TECHNOLOGY
T.Y. B.Tech. (ETC) (Sem-V)
Control System
(Revised)

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

Please check whether you have got the right question paper.

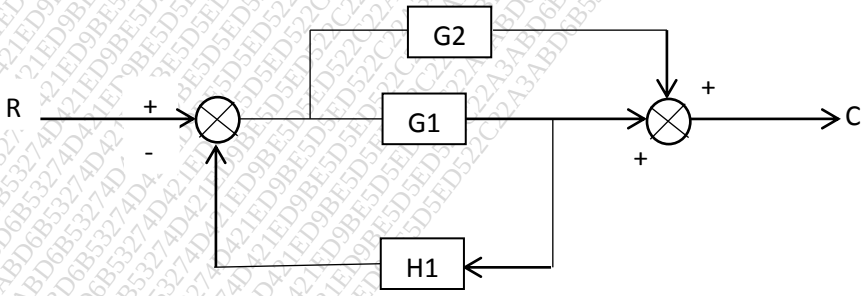
N.B
1) Q. No. 1 and Q. No.6 are compulsory.
2) Attempt any two questions from the remaining Questions in each section.
3) Figures to the right indicates full marks.

Section A

Q.1 Answer any five (05) of the following in Brief. 10

a) Differentiate between open loop control system & close loop control system?
b) What is signal flow graph?
c) Define non-touching loop?
d) For the transfer Function
$$G(S) = \frac{K(S+1)(S+2)}{S(S^3+2S^2+2S)}$$
What is the order & type of system?
e) How the system is classified depending on the value of damping?
f) Define steady state error, also enlist the error coefficients?
g) Give the procedure to find stability of a system using Routh's –Hurwitz criteria?

Q.2 a) Draw a signal flow graph for the block diagram below, Determine the overall transmittance? 08



b) Determine the rang of 'K' SO that the system is marginally stable and find the frequency of sustained oscillations. For the equation $S^4 + 25S^3 + 15S^2 + 2OS + K = 0$ 07

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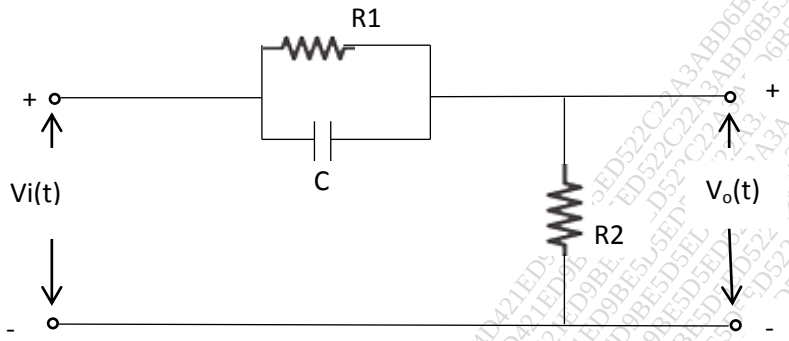
Q.3 a) Find out the transfer function of given electrical network Vo(S) / Vi(S): 08



b) Draw the approximate root locus diagram for a system having open loop transfer function. 07

$$G(S)H(S) = \frac{K}{S(S+5)(S+10)}$$

Q.4 a) What is position error coefficient (K_P), velocity error coefficient (K_v), acceleration error coefficient (K_a) and Steady state error (e_{SS}). Derive the expressions for these for type-2 system? 08

b) Derive the expression for underdamped response of the system of second order subjected to unit step input, i.e. 07

$$((t) = 1 - \frac{e^{-\xi\omega_{nt}}}{\sqrt{(1-\xi^2)}}\, Sin\left(\omega_n\sqrt{(1-\xi^2)}\; t + \tan^{-1}\frac{\sqrt{(1-\xi^2)}}{\xi}\right)$$

Q.5 Write short notes on (any three) 15

a) Characteristic equation
b) Block diagram reduction reduction rules.
c) Routh – Hurwitz stability criteria.
d) R.L.C. Network analysis

Section - B

Q.6 Answer any Five (05) of the following in brief. 10

a) What is Nyquist Stability Criteria?
b) How stability is defined based on information of gain & phase margin?
c) What is state variable & standard form of state model?
d) Using Bode plot, how stability can be determined?
e) Draw the state diagram for MIMO system?
f) What is PID Controller
g) What are the characteristics of ON/OFF Controller?

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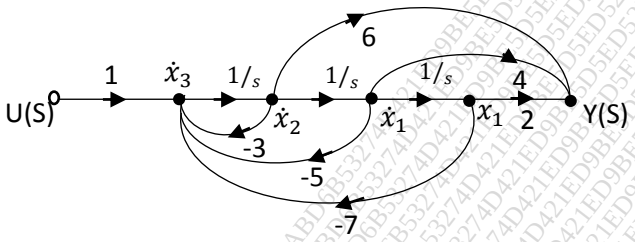
Q.7 a) For the transfer function 08

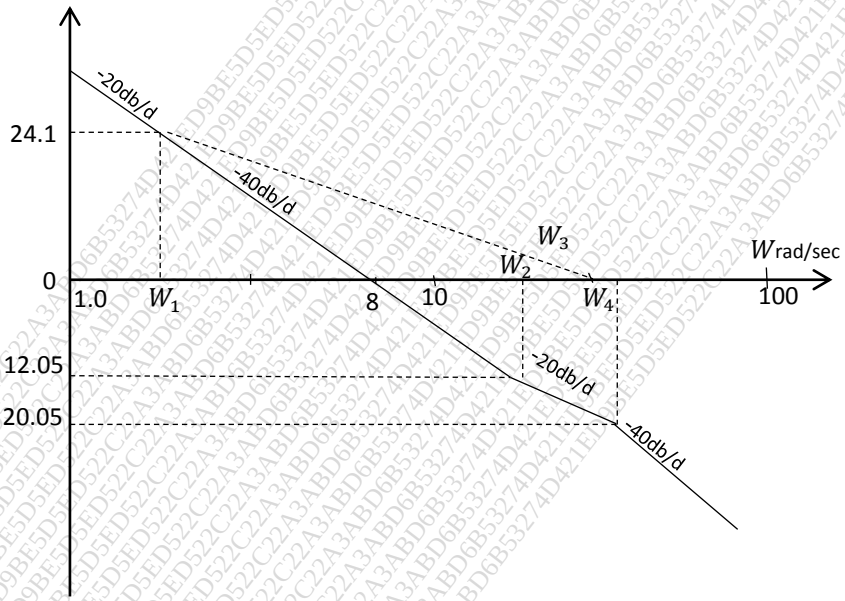
$$\frac{Y(S)}{U(S)} = \frac{2S+3}{S^2+5S+6}$$

Write the state model matrix equation?

b) For the signal flow graph below write the state model matrix equation. 07



Q.8 Determine the open – loop transfer function from the Bode plot shown? 15



Q.9 a) A unity feedback control system has 08

$G(S) = \frac{10}{S(S+1)(S+2)}$ Draw the Nyquist plot & comment on closed loop stability.

b) Obtain the solution for state equation (refer Q.9a) Transfer function) 07

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

a) Proportional controller
b) PID controller
c) Digital Control System
d) Polar Plot.

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Total No. of Printed Pages:01

SUBJECT CODE NO:- H-1421
FACULTY OF SCIENCE AND TECHNOLOGY
T.Y.B.Tech. (ETC) (Sem-V)
Elective-II Programming in JAVA
(Revised)

[Time: Two Hours] **[Max.Marks:40]**

Please check whether you have got the right question paper.

N.B
1. Question 1 and 5 are compulsory.
2. Attempt any two from remaining from each section.

Section A

Q.1 Attempt any three: 06
a) Define abstraction.
b) List 4 features of Java.
c) What is method overloading?
d) Define exception in Java.
e) List various types of inheritance.

Q.2 a) What are constructors, give examples. 03
b) Write program to show arithmetic exception handling in Java. 04

Q.3 a) Compare overloading and overriding. 03
b) What is abstract class give example? 04

Q.4 a) Write program of calculator in Java. 03
b) What is inheritance give example? 04

Section B

Q.5 Attempt any three 06
a) What of applet.
b) Define thread in Java.
c) Give example of interface in Java.
d) Why use packages in Java.
e) What is thread priority?

Q.6 a) Give life cycle of thread with diagram. 03
b) Compare interface and abstract class. 04

Q.7 a) Give life cycle of applet. 03
b) Give example of interface in Java. 04

Q.8 a) Write program to demonstrate multi – threading in Java. 03
b) Give application of applet. 04

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Total No. of Printed Pages:1

SUBJECT CODE NO:- H_1423
FACULTY OF SCINECE AND TECHNOLOGY
T.Y.B.Tech. (ETC) (Sem-V)
Elective-II Optical Fiber Communication
(Revised)

[Time: Two Hours] **[Max.Marks:40]**

Please check whether you have got the right question paper.

N.B
1. Q.No.1 and Q.No.5 are compulsory.
2. Solve any two questions from each section, from the remaining questions.
3. Assume suitable data if necessary.

Section A

Q.1 Solve any three 06
- a) Define Refractive index.
- b) What is total internal Reflection
- c) Enlist components of optic fibre.
- d) Enlist advantages of optical fiber communication

Q.2
- a) Explain electromagnetic spectrum. 03
- b) Draw block diagram of optical fiber system. 04

Q.3
- a) Which are the different types of optical fibre. 03
- b) Explain different types of dispersion. 04

Q.4
- a) What do you mean by coupling losses? 03
- b) Which are different types of coupling? 04

Section B

Q.5 Solve any three 06
- a) Enlist the sources of optics
- b) What do you mean by OTDR? Enlist application
- c) Enlist types of photo detector.
- d) Explain working principle of LED.

Q.6
- a) Explain the concept of power launching & coupling 03
- b) Compare between PIN diode & avalanche photo diode. 04

Q.7
- a) Explain SLED in detail. 03
- b) Explain digital link & its advantages. 04

Q.8
- a) Explain the different types of optical sources. 03
- b) Explain wavelength division multiplexing 04

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Total No. of Printed Pages:1

SUBJECT CODE NO:- H-1422
FACULTY OF SCIENCE AND TECHNOLOGY
T.Y.B.Tech. (ETC) (Sem-V)
Elective-II Microelectronics
(Revised)

[Time: Two Hours] **[Max.Marks:40]**

Please check whether you have got the right question paper.

N.B
1. Q.No.1 and Q.No.5 are compulsory.
2. Solve any two from the remaining questions from section 'A' and section 'B' each.
3. Assume suitable data wherever necessary.
4. Figures to the right indicate full marks.

Section A

Q.1 Solve any three from the following 06
a) Compare between PMOS, NMOS, CMOS?
b) Define LSI, MSI, VLSI, ULSI?
c) What is vapour deposition process in fabrication?
d) Draw only pass transistor circuit.

Q.2 Draw and explain VI characteristics of depletion & enhancement type MOSFET, explain various regions of it? 07

Q.3 With neat diagrams explain p-well type of CMOS fabrication. 07

Q.4 Explain NMOS inverter. 07

Section B

Q.5 Solve any three from the following 06
a) Define area capacitance with its proper unit?
b) Define sheet resistance with its proper unit?
c) Comment on 'Stick diagrams'?
d) Give the MOS layers details?

Q.6 Explain Latch up in CMOS circuits? 07

Q.7 Give Lambda based design rules for CMOS Technology? 07

Q.8 Explain the concept of structured design of combinational logic. Define circuit simulation. What is its use? 07

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Total No. of Printed Pages:02

SUBJECT CODE NO:- H-1438
FACULTY OF SCIENCE AND TECHNOLOGY
T.Y. B.Tech. (ETC) (Sem-VI)
Embedded System Design
[Revised]

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

Please check whether you have got the right question paper.

N.B
1) Q.1 and Q.5 are compulsory.
2) Attempt any two questions from section A and section B

Section A

Q.1 Attempt any five of the following 10
a) Give any four features of PIC18F4550
b) Draw status register format of PIC18 microcontroller.
c) Mention alternate functions of port c of PIC18F4550
d) What is function of TRIS register? How can any port configure as I/O using TRIS register?
e) What are data modifiers? Enlist them.
f) Write Initialization statement for LCD to work in 4 bit mode, 16x2
g) Enlist the registers used in PWM generation along with their functions.

Q.2 a) Draw PIC18 status register format and explain about each bit with proper example. 08
b) Draw and explain TOCON register. 07

Q.3 a) Compare assembly language programming with High level 'C' language. 08
b) Explain Basic data types and Data modifiers with proper examples. 07

Q.4 a) Enlist Sources of interrupts in PIC18 microcontroller. Draw and explain INTCON register. 08
b) Explain PWM generation using CCP module by mentioning specific registers used. 07

Q.5 a) Draw Interfacing of DC motor with PIC18. Write C18 program to control speed of DC motor using PWM. 08
b) Explain SPI bus protocol with neat diagram. 07

Section B

Q.6 Attempt any five of the following 10
a) Write following pin function of ATmega 328
i) MOSI ii) MISO iii) SCK iv) ICP1
b) Write any four features of ATmega 328
c) Enlist any four interrupt sources of ATmega 328
d) Give examples of each (any two)
i) Operators ii) Variables
e) Enlist alternate functions of port C for ATmega 328
f) Write different examples (versions) of Arduino boards

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g) Write specifications of (HC-SR04) ultrasonic sensor.

Q.7 a) Enlist operating modes of Timero (TCN To). Explain fast PWM mode in detail with neat diagram. 08

b) Explain serial port (USART) of ATmega 328. Draw frame format of USART and mention details of frame. 07

Q.8 a) Write a program to display 0 to 9 on 7 segment display using Arduino 08

b) Explain following data types in detail. 07
i) long ii) short iii) char iv) int

Q.9 a) Write an Arduino program to generate a delay using timer o 08

b) Draw and Explain interfacing of LCD with Arduino. Write a program to display 'HELLO' on LCD 07

Q.10 a) Draw and explain interfacing of DC motor with Arduino. Write a program to control speed of motor 08

b) Give the features of HC-05 Bluetooth module. Draw and explain interfacing diagram of arduino with Bluetooth. 07

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Total No. of Printed Pages: 02

SUBJECT CODE NO:- H-1445
FACULTY OF SCIENCE AND TECHNOLOGY
T.Y. B.Tech. (ETC) (Sem-VI)
Microwave Theory and Techniques
[Revised]

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

Please check whether you have got the right question paper.

N.B
1) Q. 1 and Q. 6 are compulsory
2) Solve any two questions from the remaining in each section
3) Assume suitable data if necessary.

Section A

Q.1 Attempt any five 10
a) What is waveguide? State its types.
b) What is the cut off wavelength of a rectangular waveguide having dimensions $2.5cm \times 1\ cm$
c) State the properties of S-Matrix
d) Write S matrix for 4 port circulator.
e) Define Insertion loss and coupling factor of directional coupler.
f) State the types of Attenuator.

Q.2 a) Why TEM mode does not exist in rectangular waveguide? Compare TE and TM modes. 08
b) A rectangular wave guide has dimensions $4\ cm \times 2\ cm$. If the operating frequency is 6 GHz, then calculate the following for the dominant TE mode. 07
1) Guide wavelength
2) Cut off wavelength
3) Phase velocity

Q.3 a) What is Magic Tee? Explain its applications. 07
b) Explain construction & working of two hole directional coupler with diagram. 08

Q.4 a) What is circulator? Analyze circulator using S-matrix 08
b) What is E-plane Tee? Analyze it using s- matrix. 07

Q.5 Write short notes on- 15
a) phase shifter
b) Strip lines
c) Isolator

Section B

Q.6 Attempt any five 10
a) Draw the characteristics of TRAPATT diode.
b) Define velocity modulation
c) What is the use of slow wave structure in TWT?
d) What is Gunn Effect?

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e) Draw the B. D of microwave bench.
f) Why magnetron is called as cross field (tube) device.

Q.7 a) Explain in detail operating modes of Gunn diode 08
b) Explain operation of schottky barrier dia with dia. 07

Q.8 a) Explain operation of Reflex klystron how it is working as an oscillator? Draw Applegate dia. 08
b) What are the limitations of conventional tubes of microwave frequencies? 07

Q.9 a) Draw & explain set up for VSWR measurement. 08
b) Explain phase shift measurement technique in detail with B.D. 07

Q.10 Write short notes on – 15
a) Measurement of Parameters
b) Cavity Magnetron
c) IMPATT Diode

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Total No. of Printed Pages:3

SUBJECT CODE NO:- H-1452
FACULTY OF SCINECE AND TECHNOLOGY
T.Y. B.Tech. (ETC) (Sem- VI)
VLSI Design
[Revised]

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

Please check whether you have got the right question paper.

N.B 1) Q.no.1 from section A and Q.no.6 from section B are compulsory.
2) Solve any two questions from remaining questions in each section.

SECTION – A

Q.1 Attempt any five: 10

a) Write entity for 2:4 decoder
b) What is VHDL?
c) Identify bug in following program entity design is

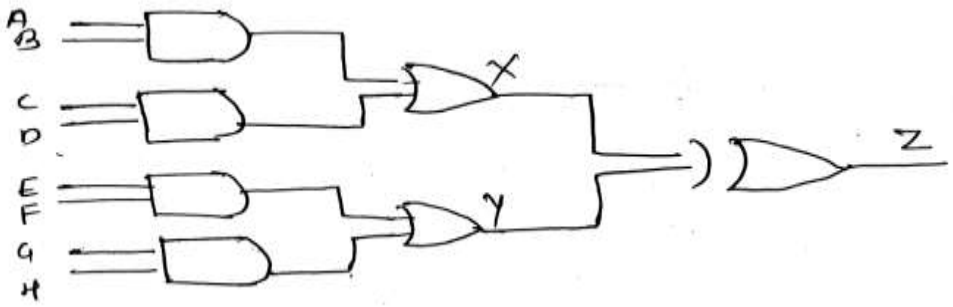
```
Port (a,b,c : in std- logic ;
      d: out std- logic – vector );
end gates ;
```

d) List sequential statements used in VHDL
e) What is a testbench?
f) Which are design constraints in VLSI

Q.2 a) Write syntax of case statement write VHDL code for 4:1 multiplexer using case statement 08
b) Write VHDL code for full adder. 07

Q.3 a) Describe delays used in VHDL 08
b) Describe data types used in VHDL. 07

Q.4 a) Write VHDL code for following design using behavioral modeling style. 08



b) Write a note on operators used in VHDL. 07

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Q.5 a) Write VHDL code for binary to grey code converter 08

b) What is Package declaration and Package body? 07

Section - B

Q.6 Attempt any five 10

a) List types of PLD's

b) Draw state diagram of D flip – flop

c) Write equation of moore machine

d) List simulation & synthesis tools

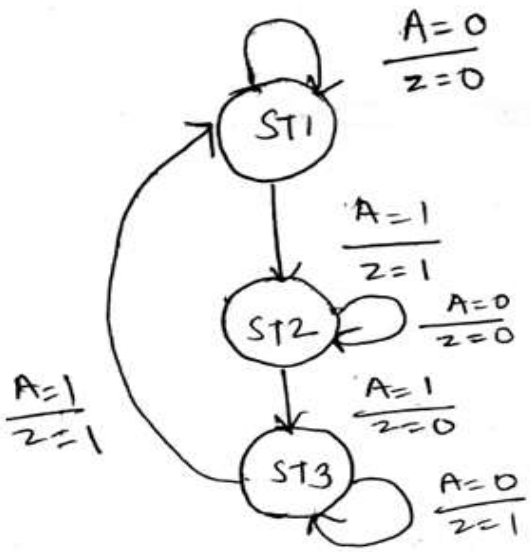
e) What is FSM?

f) Which are different element of ASM charts?

Q.7 a) Describe architecture of CPLD 08

b) Compare FPGA with CPLD 07

Q.8 a) Write VHDL code for following state diagram 08



b) What is optimization? Describe flattening & factoring process 07

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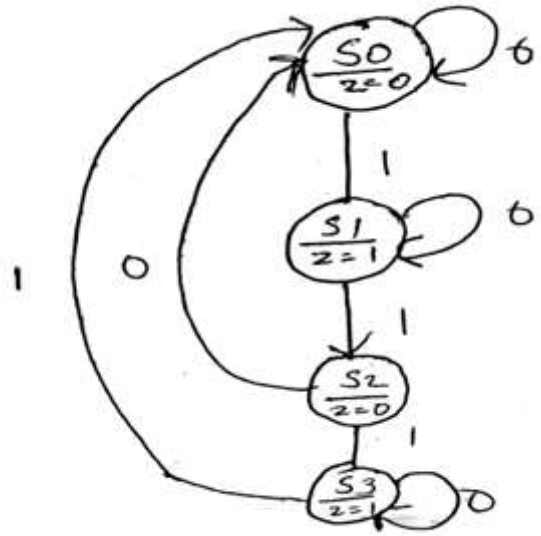
Q.9 a) Draw ASM chart for following state diagram 08



b) Describe simulation process in detail 07

Q.10 a) What is JTAG? Describe JTAG and TAP controller 08

b) Describe synthesis process in detail. 07

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Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1018
FACULTY OF SCIENCE AND TECHNOLOGY
T.Y.B.Tech. (ETC) (Sem VI)
Information Theory & Coding
[OLD]

[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) Q. No.2 to 5 and Q.No.7 to 10 solve any two questions from each section.

Section A

Q.1 Attempt any five: 10
(a) Define mutual information.
(b) Write relationship between probability and information.
(c) Explain binary symmetric channel.
(d) State information capacity theorem.
(e) What is BCH code?
(f) What is state table?
(g) What is source coding theorem?

Q.2 (a) Perform Shannon fano coding for {1/2, 1/8, 1/8, 1/16, 1/16, 1/32, 1/32}. Also find efficiency. 08
(b) Explain average mutual information and entropy. 07

Q.3 (a) Explain channel model with its block diagram. 08
(b) Consider a DMS with seven possible symbols x_i $i = 1, 2, \ldots\ldots\ldots, 7$ and corresponding probabilities $p(x_1) = 0.37, p(x_2) = 0.33, p(x_3) = 0.16, p(x_4) = 0.07, p(x_5) = 0.04, p(x_6) = 0.02, p(x_7) = 0.01$. Find the entropy and average no. of binary digit per symbol. 07

Q.4 (a) Explain channel coding in detail. 08
(b) Describe Hamming code with an example. 07

Q.5 (a) Explain source coding theorem in detail. 08
(b) Explain channel capacity for MIMD system. 07

Section B

Q.6 Attempt any five: 10
(a) What is shortened cycle code?
(b) Determine that given code is cyclic code or not?
C={000, 010, 011, 111}
(c) What is BCH code?
(d) What is cryptography?
(e) What is cipher text?
(f) Explain burst error correction.
(g) Explain Golay code with an example.

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Q.7	(a)	For cyclic code (7,3). Find generator polynomial and check whether received codeword is correct or not 1011101.	08
	(b)	Explain symmetric and asymmetric cryptography.	07
Q.8	(a)	Find the equivalent codeword for message 1010 for $g(x) = x^3 + x + 1$ and also draw cyclic encoder.	08
	(b)	Explain RSA algorithm.	07
Q.9	(a)	Explain Trellis codes with an example.	08
	(b)	Explain transposition cipher.	07
Q.10	Write short note on:		15
	(a)	Viterbi decoding	
	(b)	Process of encryption and decryption	
	(c)	Biometric encryption	

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Total No. of Printed Pages:02

SUBJECT CODE NO:- H-1043
FACULTY OF SCIENCE AND TECHNOLOGY
T.Y. B.Tech. (ETC) (Sem-VI)
Antenna Theory
[Old]

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

Please check whether you have got the right question paper.

N.B
1) Answering of question no. 1 and 6 are compulsory.
2) Answer any two questions from question no 2, 3, 4 & 5 from section A and answer any two questions from question no 7, 8, 9, & 10 from section B.
3) Assume suitable data if necessary.

Section A

Q.1 Answering any five from the following: 10
a. Define Beam width and Bandwidth.
b. Draw radiation pattern of end fire array.
c. Write advantages of folded dipole antenna.
d. Radiation resistance of half wave dipole antenna is ____
e. List various excitation methods of antenna.
f. State FRIIS formula.

Q.2
a) A thin dipole antenna $\lambda/15$ long. If its resistance is 1.5Ω . Find radiation resistance and efficiency. 06
b) An antenna has radiation resistance of 72Ω , load resistance of 8Ω and power gain of 12 dB. Find its directivity and antenna efficiency. 06
c) Describe self and mutual impedance. 03

Q.3
a) Derive radiated field equation for infinitesimal dipole. 09
b) Describe ground and earth curvature effect for circular loop. 06

Q.4
a) Prove that side lobe ration of uniform array is -13.47. 06
b) Compare broadside array and end fire array. 06
c) Mention different impedance matching techniques. 03

Q.5 Write short note on. 15
a) Finite length dipole
b) Binomial array
c) Reciprocity theorem.

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Section B

Q.6	Answer any five from the following:		10
	a)	Define frequency independent antenna.	
	b)	State application of log periodic antenna	
	c)	How circular polarization is achieved in patch antenna?	
	d)	What is specialty in multimode horn antenna?	
	e)	Draw diagram of smart antenna.	
	f)	List out types of reflector antenna.	
Q.7	a)	Write design steps of log periodic antenna explain with example.	09
	b)	Describe rectangular patch antenna.	06
Q.8	a)	Draw pyramidal horn antenna explain its construction, working, advantages and applications.	08
	b)	Draw E plane sectoral horn and write its radiated field equation. Explain its working.	07
Q.9	a)	Describe parabolic reflector antenna used at microwave frequency.	07
	b)	A 64 meter diameter parabolic reflector is fed by a non-directional antenna at1430 MHz. Calculate HPBW, FNBW and power gain with reference to dipole of half wavelength.	06
	c)	List out feed method for parabolic reflector.	02
Q.10	Write short note on.		15
	a)	Yagi uda antenna	
	b)	Corrugated Horn	
	c)	Corner reflector	

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Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1069
FACULTY OF SCIENCE AND TECHNOLOGY
T.Y.B.Tech. (ETC) (Sem VI)
VLSI Design
(OLD)

[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. Solve any two questions from the remaining questions in each section

Section A

Q.1	Attempt any five question		10
	a)	What is CAD?	
	b)	What is Sensitivity list?	
	c)	Write syntax of entity declaration	
	d)	What is VHDL?	
	e)	Write VHDL code for half substractor	
	f)	Enlist types of delays in VHDL	
Q.2	a)	What is an architecture? Describe it with one example	08
	b)	Write VHDL code for full adder.	07
Q.3	a)	Write VHDL code for 8:3 encoder.	08
	b)	Write a note on data types	07
Q.4	a)	Give syntax of case statement and explain with one example	08
	b)	Write VHDL code of flip flop	07
Q.5	a)	Which operators are used in VHDL	08
	b)	Write a note on functions in VHDL	07

Section B

Q.6	Attempt any five question		10
	a)	What is Moore machine?	
	b)	What is a stick diagram?	
	c)	Why there is need at testability?	
	d)	Enlist synthesis tools	
	e)	Draw state diagram of to flip flop	
	f)	What is fault coverage	
Q.7	a)	Describe architecture of CPLD	08
	b)	Write a note on optimization process	07
Q.8	a)	With the help of appropriate diagram describe mealy machine	08

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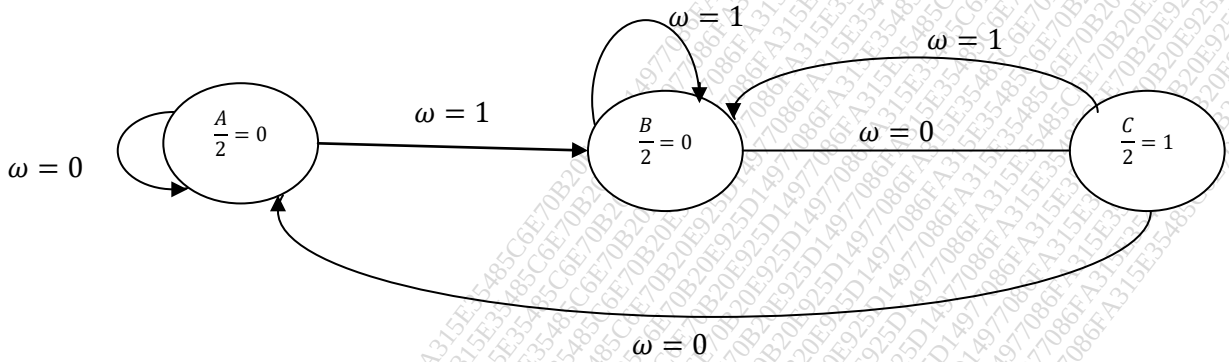
b) What is boundary scan? 07

Q.9 a) Describe synthesis process 08

b) Draw and explain architecture of FPGA 07

Q.10 a) What is Simulation? Explain it in detail with its types 08

b) Draw ASM chart for 07



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Total No. of Printed Pages:01

SUBJECT CODE NO:- H-1152
FACULTY OF SCIENCE AND TECHNOLOGY
T.Y. B.Tech. (ETC) (Sem-VI)
Electronics Measurement
[Old]

[Time: Two Hours] **[Max. Marks: 40]**

Please check whether you have got the right question paper.

N.B
1) Question no. 1 from Section A & Question no.5 from Section B are compulsory.
2) Solve any two questions from remaining questions of Section A & B each.
3) Figure to the right indicates full marks.

Section A

Q.1 Attempt any three from the following: 06

a) Define precision, accuracy, sensitivity, resolution.
b) Compare primary & national standards.
c) What are the precaution to be taken while using voltmeter?
d) State the uses of oscilloscope.

Q.2 A set of independent voltage measurements taken by four observers was recorded as 117.02V, 117.11V, 117.08V and 117.03V. 07
Calculate:- 1) The average voltage 2) Range of error

Q.3 How the TVM works, why does a TVM uses FET as input stage transistor? 07

Q.4 With neat block diagram describe the working of a DSO. 07

Section B

Q.5 Attempt any three from the following:- 06

a) Enlist the standard specifications of signal generator?
b) What are the different types of bridges?
c) What is Q-meter?
d) What is wave analyzer, what are the applications of it?

Q.6 Draw the neat block diagram of function generator and explain in detail? 07

Q.7 With the principle of working. Explain stroboscope, give its applications? 07

Q.8 What is distortion, also define Harmonic distortion. Explain Harmonic distortion analyzer with the help of block diagram? 07

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Total No. of Printed Pages:03

SUBJECT CODE NO:- H-1177
FACULTY OF SCIENCE AND TECHNOLOGY
T.Y. B.Tech. (ETC) (Sem V)
Control System
[Old]

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

Please check whether you have got the right question paper.

N.B
i. Question No. 1 and Question No. 6 are compulsory. Attempt any two of the following from the remaining in each section.
ii. Assume suitable data, if necessary.
iii. Figure shown in right side indicates full marks.

Section A

Q.1 Answer any two of the following in brief: 10

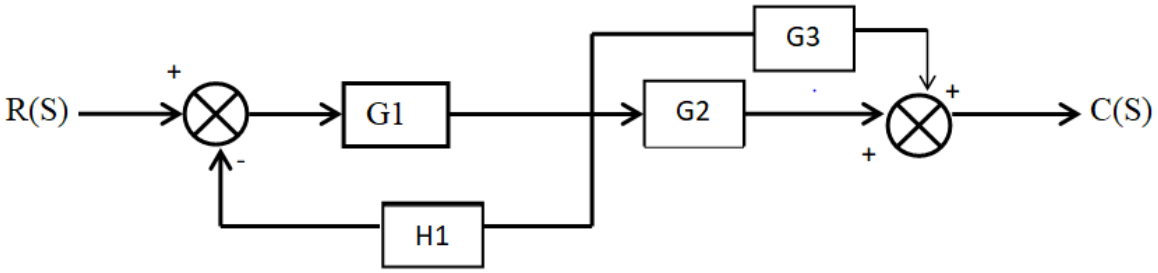
a) The transfer function of a system is given below.

$$G(S) = \frac{8(S+3)(S+4)}{S(S+2)^2\,(S^2+2S+5)}$$

Determine the poles & zero and show the pole-zero configuration in S-plane

b) The impulse response of a system is given by $g(t) = e^{-t}(1-\cos 2t)$ determine the transfer function of the system.

c) Draw signal flow graph for the Block diagram & find transfer function using Mason's gain formula.



Q.2 a) Derive the expression for under- damped response of the second order system subjected to unit step input i.e. $C(t) = 1 - \frac{e^{-\xi wnt}}{\sqrt{(1-\xi^2)}} \sin\left(\left(w_n\sqrt{(1-\xi^2)}\right)t + \tan^{-1}\frac{\sqrt{1-\xi^2}}{\xi}\right)$ 08

b) Draw a root locus for the given expression of open loop transfer function $G(S)\,H(S) = \frac{K}{S(S+2)\,(S+4)}$ 07

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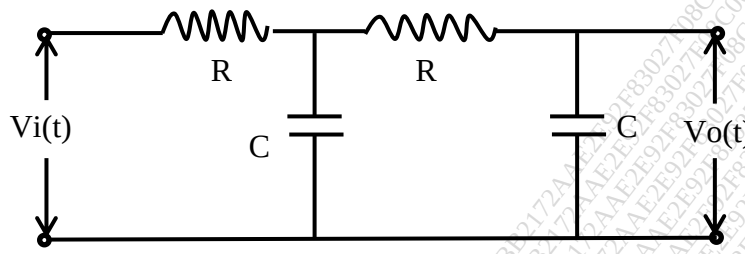
Q.3 a) Find out the transfer function of given electrical network: 08



b) The overall transfer function of a unity feedback control system is given by 07

$$\frac{C(S)}{R(S)} = \frac{10}{S^2 + 6S + 10}, Find\ Kp, Kv, Ka$$

Q.4 a) State Hurwitz criteria? What are the advantages & Hurwitz criteria? Find the no. of roots in the right half of S-plane using Routh's criterion, for the characteristics equation given below. 08

$$S^5 + S^4 + 2S^3 + 2S^2 + 3S + 5 = 0$$

b) What are feedback and feed forward control system? Explain with neat block diagram. 07

Q.5 Write a short note on any three of the following: 15

a) Characteristics equation.
b) RLC network analysis.
c) Time-domain stability analysis method.
d) Special cases of R-H criteria.

Section B

Q.6 Answer any two of the following in brief 10

a) Give the constructional details of DC servomotors.
b) Bring out the co-relation between time domain and frequency domain specifications.
c) What are the advantages of state space analysis over conventional control system analysis method?

Q.7 a) What PLC? Explain the detailed block diagram of PLC & give it's specifications 08

b) Obtain the state transition matrix for the system 07

$$\begin{bmatrix} \dot{x_1} \\ \dot{x_2} \end{bmatrix} = \begin{bmatrix} -3 & 1 \\ 0 & -1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

Q.8 a) A unity feedback system, $G(S) = \frac{800(S+2)}{S^2(S+10)(S+40)}$ Sketch the Bode plot. Comment on stability 10

b) Obtain the solution for state matrix equation. 05

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Q.9

a) For a unity feedback system, $G(S) = \frac{80(S+2)}{S^2(S+10)(S+40)}$ sketch the Nyquist plot & comment on close loop stability. 10

b) State and explain the role of actuator in control system. Give the different types of actuations. 05

Q.10 Write short note on any three of the following: 15

a) PID controller
b) Pulse transfer function
c) Concept of state, state variable and state space
d) Lead & lag network in frequency domain analysis

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Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1198
FACULTY OF SCIENCE AND TECHNOLOGY
T.Y. B.Tech. (ETC) (Sem-V)
Microprocessors & Peripherals
[Old]

[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 remaining in each section.
iii) Assume suitable data if necessary.

Section A

Q.1 **Answer any FIVE of the following:** 10

(a) List the flags of 8085.
(b) Describe the function of ALE & HOLD pins of 8085.
(c) List any four features of 8085.
(d) Enlist different data transfer schemes of microprocessor.
(e) Enlist the modes of 8253 timer.
(f) Explain why data lines & address lines are multiplexed in 8085.

Q.2 a) Draw the functional architectural diagram of 8085. Briefly explain the function of each block. 08

b) Explain the different addressing modes of 8085 with example. 07

Q.3 a) Draw the timing diagram of MVIr 08

b) Enlist the features of 8255 07
Explain BSR mode of 8255.

Q.4 a) Write assembly language program to add two 16 bit numbers. The first number is stored in memory location 7100H and 7101 H. The second number in memory location 7102 H & 7103 H. Store the result in the memory location 7104 H and 7105 H. 08

b) Interface 8 LED's with 8085 through 8255. Write a program for rolling display. 07

Q.5 **Write a note on any three:** 15

a) Need of I/O ports.
b) Mode-2 and mode-3 of 8253.
c) USART 8251.
d) Interrupts in 8086.

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Section B

Q.6 **Attempt any five of the following:** 10

a) What is MN/$\overline{MX}$ pin of 8086?
b) List the features of 80386 microprocessor.
c) What is instruction queue of 8086?
d) Explain the DIV instruction of 8086.
e) What is the function of SI & DI registers.
f) Differentiate conditional flags & control flags.

Q.7 a) Explain with example various addressing modes of 8086. 07
b) What is pipe lining? How it is achieved in 8086 microprocessor. 08

Q.8 a) Explain with neat diagram architecture of 8086. 08
b) Explain closely coupled configuration of 8086 07

Q.9 a) Enlist the features of Pentium & Pentium pro. 07
b) What is assembler? Explain any five assemblers. 08

Q.10 a) Explain minimum mode configuration of 8086 microprocessor. 08
b) What is the role of IOP 8089 in multiprocessor system? 07

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Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1267
FACULTY OF SCIENCE AND TECHNOLOGY
T.Y.B.Tech. (ETC) (Sem-V)
Electronic Circuit Design Technology
[OLD]

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

Please check whether you have got the right question paper.

N.B
1. Assume suitable data if required
2. Question No.1 and 6 are compulsory
3. Solve any two questions from the remaining section A and Section B each.

Section A

Q.1 Answer the following questions: 10
a) Define Buck converter.
b) What is the need of packaging?
c) List out the features of LM3352.
d) Draw the pin diagram of IC7107
e) What are the applications of PC817.

Q.2 a) Explain the classification of electronic components packages on the basis of shape, size and material. 07

b) Design constant current source using LM1117 for the output current 500MA and load resistance 20Ω. 08

Q.3 a) Design multirange dc voltmeter with internal resistance of R_m=50Ω and I_{fsd}= 50μA for the voltage range $0 - 5V - 15V - 20V - 50V$. 08

b) Design multirange dc ammeter to satisfy following specifications. 07
$R_m = 500\Omega, I_{fsd} = 1mA$
For the current range 0-5mA, 10mA, 50mA ,100mA

Q.4 a) Explain construction and working of dc motor. 08

b) Explain isolation technique using optocoupler PC817. 07

Q.5 Write short note on: 15
a) Design of variable power supply using LM2576
b) Solid state relay
c) Stepper motor

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Section – B

Q.6 Answer the following questions: 10

a) Define ergonomics
b) What is EMI filter?
c) Define relative humidity
d) What are the type of PCB?
e) List out the applications of touch sensor.

Q.7 a) Explain construction and working of capacitive touch sensor. 08

b) What is hygrometer? Explain construction & working of resistive hygrometer. 07

Q.8 a) Explain an electronic product development phases in detail. 08

b) What is selection crieteria for enclosure material selection? 07

Q.9 a) Explain different noise sources in electronics. 08

b) Explain grounding rules in PCB design. 07

Q.10 Write a short note on: 15

a) PCB manufacturing process.
b) Thermal management & its types
c) Accelerometer

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Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1302
FACULTY OF SCIENCE AND TECHNOLOGY
T.Y.B.Tech. (ETC) (Sem-V)
Digital Signal Processing
[OLD]

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

Please check whether you have got the right question paper.

N.B i) Question No.1 and Question No.6 are compulsory from Section A & 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) Assume suitable data if necessary and solve it clearly.

Section – A

Q.1 Attempt any two of the following 10

a) Explain advantages of digital signal processing over Analog signal processing.
b) Describe the relation between Fourier transform and Z-transform.
c) Explain direct form I structure and direct form II structure.
d) Explain Impulse invariance method for IIR filter design.

Q.2 a) Explain structure of realization of FIR systems. 08
b) Determine whether following system is linear or nonlinear and Time invariant or Time variant system. 07
a) $y(n) = x(n-2)$ b) $y(n) = \cos x(n)$

Q.3 a) Compute DFT of sequence $x(n) = \{1,0,0,1\}$ 08
b) Explain the properties of DFT. 07

Q.4 a) For the analog transfer function $HS = \frac{(S+1)}{(S+2)(S+4)}$ determine H(z) using impulse invariant method if; a) T=1 second b) T=0.5 second 08
b) Explain overlap Add method, overlap save method. 07

Q.5 a) Perform the circular convolution of the following two sequence 05
$x_1(n) = \{1,2,3,4\}\ x_2(n) = \{1,2,1,2\}$
b) Compute the eight point DFT of the sequence 10
$x(n) = \begin{cases} 1 & 0 \le n \le 7 \\ 0 & otherwise \end{cases}$
by using the decimation in frequency FFT algorithm.

Section – B

Q.6 Attempt any two of the following. 10
a) Explain multiply accumulate unit of digital signal processor
b) Wrapping effect

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c) Sampling rate conversion by rational factor I/D.
d) Explain frequency sampling method for design of FIR filter.

Q.7 a) Determine the coefficient of a linear phase FIR filter of length M=15 has a symmetric unit sample response and a frequency response that satisfies the conditions 10

$$H\left(\frac{2\,\pi k}{15}\right) = 1; K = 0,1,2,3$$
$$= 0; K = 4,5,6,7$$

b) Explain Quantization effects in Analog to digital conversion of signals. 05

Q.8 a) Explain Hamming window in detail. 08
b) What is FIR? Explain symmetric and Anti symmetric FIR filters 07

Q.9 a) Explain multirate signal processing in detail. 08
b) Explain any one application of DSP in detail. 07

Q.10 a) Explain Architecture of TMS320CS4X in detail. 08
b) Explain product quantization, scaling, quantization Errors in the computation of DFT. 07

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Total No. of Printed Pages:1

SUBJECT CODE NO:- H-1350
FACULTY OF SCIENCE AND TECHNOLOGY
T.Y.B.Tech. (ETC) (Sem -V)
Microelectronics
[OLD]

[Time: Two Hours] **[Max.Marks:40]**

Please check whether you have got the right question paper.

N.B
i) Question No.1 and 4 are compulsory.
ii) Assume suitable data wherever necessary.
iii) Figures to the right indicate full marks.

Section A

Q.1	a) Draw and explain VI characteristics of depletion & enhancement mode MOSFET.	04
	b) List the parameters of MOSFET & explain.	04
Q.2	With neat diagrams explain NMOS enhancement type MOSFET fabrication.	06
	OR	
	What do you mean by thermal aspects of processing on NMOS and CMOS fabrication?	06
Q.3	Write a short note on pass transistor.	06
	OR	
	Derive the relationship between drain to source current & drain to source voltage for linear as well as saturation mode.	06

Section B

Q.4	a) Comment on stick diagrams?	04
	b) Explain delay unit.	04
Q.5	Explain in detail lambda based design rules.	06
	OR	
	What is Super Buffer, where it's used, also give it's advantages?	06
Q.6	Write a note on Latch up in CMOS circuits.	06
	OR	
	Give a case study on half adder circuit using spice circuit simulation.	06

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Total No. of Printed Pages:02

SUBJECT CODE NO:- H-1382
FACULTY OF SCINECE AND TECHNOLOGY
T.Y. B.Tech. (ETC) (Sem-V)
Microprocessors and Microcontroller
(Revised)

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

Please check whether you have got the right question paper.

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

Section A

Q.1 Attempt **any FIVE** of the following 10

a) Why AD_0 to AD_7 lines are multiplexed?
b) Give the function RESET and READY pins of 8085.
c) Give difference between memory mapped I/O & I/O mapped I/O.
d) Give the function of interrupt request register of 8259.
e) What is fully nested mode?

Q.2
a) Draw the timing diagram of ADD M. 08
b) Write a delay subroutine for generating a delay of 0.4 sec. 07

Q.3
a) Write an assembly language program to find smallest number from a block of data. Block of ten numbers are stored from memory location 2200H. 07
b) Interface 7 segment display with 8085 through 8255. And write an ALP for display 0 to 9. 08

Q.4
a) Draw the block diagram of 8255 and explain each block in detail. 08
b) Draw the master slave diagram of 8259 PIC to interface 24 interrupting devices. 07

Q.5
a) With neat waveform explain mode 1 and mode 2 of 8253. 07
b) Explain different data transfer techniques of 8085 in detail. 08

Section B

Q.6 Attempt **any five** of the following 10

a) Give IP=329 CH, physical address=573H calculate segment address.
b) What do you mean by index registers?
c) Draw SCON register of 8051.
d) Enlist any four feature of 8051.
e) What is the reset value of SER's, stack pointers, and ports of 8051
f) Explain direct addressing mode of 8051 with example.

Q.7
a) Draw and explain the architecture of 8086. 08
b) What is memory segmentation? Explain it for 8086. 07

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Q.8	a)	Two 32 bit numbers are stored at Num1 and Num2 respectively. Write an instruction sequence to add these numbers and store it in Num3.	08
	b)	Write ALP to substract the content of two external memory location 7400H and 7401H. Store result at 7402H.	07
Q.9	a)	Explain in detail steps to program timer in mod 2.	08
	b)	Assuming crystal 22MHz write a program to generate a square wave of frequency 1KHz on pin 1. 2. Use timer 0, mode 2.	07
Q.10	a)	Interface LCD 16 × 2 with 8051 and write a program for communicating with LCD using a delay.	10
	b)	Write a 8051 program in C to toggle all the bits of port 1 continuously.	05

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Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1389
FACULTY OF SCIENCE AND TECHNOLOGY
T.Y. B.Tech. (ETC) (Sem-V)
Digital Communication
(Revised)

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

Please check whether you have got the right question paper.

N.B
1. Q.No.1 and Q.No.6 are compulsory.
2. Solve any two questions from remaining questions. (from each section)
3. Assume suitable data wherever is required.

Section A

Q.1 Answer any five: 10

a) State the working principle of DPCM.
b) What are the draw backs of delta modulator?
c) Define Mean & Autocorrelation of a Random Process.
d) State conditional probability.
e) Over a noisy channel 10000 digits are transmitted having a probability of error per digit of 5×10^{-5}. What is the probability of getting only two digits in error?
f) State the Formula for Binomial Distribution.
g) Define:
   i) Random variable.
   ii) Random process.

Q.2 a) Draw and explain block diagram of Adaptive Delta Modulation with its advantages over DM. 08

b) Why delta modulator is called 1-bit DPCM? Explain DPCM with neat block diagram. Give its advantages. 07

Q.3 a) Derive an expression for SNR for PCM system that employs Linear Quantization. Assume that input to the PCM system is sinusoidal. 08

b) State & prove Bayes theorem. 07

Q.4 a) Show that the random process $x(t) = A \cos(w_c t + Q)$ is wide-sense stationary. Here 'Q' is uniformly distributed random variable in the range $[0, 2\pi]$. 08

b) Explain the process of information transmission through discrete communication channel. 07

Q.5 a) A T.V signal with a BW of 4.2 MHz is transmitted using Binary PCM. The no. of Quantization levels is 512. Calculate 08
i) Code word length

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ii) Signaling rate
iii) SNR in dB
iv) Transmission BW

b) State the formula for Poissons Distribution. If 4% of the total items made by factory are defective. Find the probability that less than 2 items are defective in a sample of 50 items. 07

Section B

Q.6 Answer any five: 10

a) Represent ASK mathematically.

b) Define:
i) Processing Gain.
ii) Jamming Margin.

c) State the working principle of PSK.
d) Draw the Graphical Representation of BPSK.
e) State the applications of FHSS.
f) Define split phase Manchester code
g) Define PN-sequence

Q.7 a) Explain BPSK reception with neat block diagram. 08
b) Define ASK, FSK & PSK. Draw their waveforms. 07

Q.8 a) Explain the reception of QPSK with neat diagram. 08
b) Compare Slow and Fast Frequency Hopping. 07

Q.9 a) Encode the following Binary Data Stream 1100110 using 08
i) Polar NRZ
ii) Unipolar RZ
iii) AMI.
iv) Manchester code

b) Explain DSSS in details. 07

Q.10 a) Explain slow Frequency Hopping with neat diagrams. 08

b) The direct sequence spread spectrum communication system has following parameters. Data sequence bit duration $Tb = 4.095\ ms$ 07
PN chip duration = Tc = 1 μ sec, Eb/No= 10 for average prob. of error less than 10^{-5}.
Calculate Processing Gain & Jamming Margin.

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Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1396
FACULTY OF SCINECE AND TECHNOLOGY
T.Y. B.Tech. (ETC) (Sem-V)
Electronic Circuit Design Technology
(Revised)

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

Please check whether you have got the right question paper.

N.B
1. Assume suitable data if required.
2. Questions No.1 and 6 are compulsory.
3. Solve any two questions from the remaining section A and section B each.

Section A

Q.1 Answer the following questions. 10
a) List the features of PC817.
b) Design constant current source using LM317 for the output current 1A
c) Define sensitivity in voltmeter.
d) Design constant current source using LM117 for the output current 200MA.
e) What are the applications of MC3479 IC?

Q.2 a) Design dual dc power supply using 78XX & 79XX series IC for the following specification 08

$$V_o = \pm 5V$$

b) Design fixed dc power supply using LM2576 IC to satisfy following specifications. 07

$$V_o = +12V$$
$$I_L = 1A$$
$$fosc = 52\ KH3$$

Q.3 a) Describe design procedure for basic dc ammeter. 07

b) Design multirange dc voltmeter for the following specifications 08

$$R_m = 50\Omega\,, I_{fsd} = 60\mu A$$

Voltage range = 0-10V, 50V , 100V, 200V

Q.4 a) Describe construction & working of stepper motor. 08

b) Explain relay driver circuit using ULN 2003. 07

Q.5 Write a short note on : 15
a) Solid state relay.
b) Design of digital voltmeter using IC 7107.
c) Servo motor.

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Section – B

Q.6 Answer the following questions: 10

a) Define ground.
b) What is relative humidity?
c) What are the types of PCB?
d) Define sensor.
e) What is noise?

Q.7 a) Explain construction and working of resistive touch sensor. 08

b) Describe construction and working of PIR sensor. 07

Q.8 a) Explain various types of noise sources in detail. 08

b) Explain common mode & normal mode noise in detail. 07

Q.9 a) Explain PCB manufacturing process in detail. 08

b) Explain grounding rules in PCB design. 07

Q.10 Write a short note on: 15

a) Gyroscope.
b) Noise reduction techniques.
c) PCB design rules for digital circuits.

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Total No. of Printed Pages:02

SUBJECT CODE NO:- H-1403
FACULTY OF SCINECE AND TECHNOLOGY
T.Y.B.Tech. (ETC) (Sem-V)
Digital Signal Processing
(Revised)

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

Please check whether you have got the right question paper.

N.B
i. Question 1 and 6 are compulsory.
ii. Solve any two questions from each section.
iii. Assume suitable data if necessary.

Section A

Q.1 Attempt any five from the following: 10

a) State any two advantages of DSP over ASP.
b) Write twiddle factor matrix four point IDFT.
c) Explain bin spacing of DFT.
d) Write the name of the structures used to realize IIR systems.
e) Write the equation of IDFT with and without Twiddle factor.
f) Find 2 point DFT of $x(n) = \{1,1\}$.

Q.2 a) Realize direct form I OR Direct form II of 08

$$y(n) = 5y(n-1) - 2y(n-1) + 3y(n-3) + x(n) - 2x(n-2)$$

b) What are the different types of structures of IIR system realization? Explain any one form. 07

Q.3 a) Find 8 point DFT by using radix-2 DIT method, where $x(n) = \{1,0,0,1\}$ 07
b) Find circular convolution by using matrix method. 08

$$x(n) = \{0,1,2,3\}$$
$$h(n) = \{2,1,1,2\}$$

Q.4 a) Explain the properties of FIR filter in detail. 07
b) Explain the design procedure of FIR filter by using rectangular window. 08

Q.5 Solve any three of the following: 15

a) Explain the linearity property of DFT.
b) Calculate DFT if $x(n) = \{1,2,3,4\}$
c) Explain overlap add method in detail
d) Explain the twiddle factor concept for DFT & IDFT of 2-point & 4-point calculation.

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Section B

Q.6 Answer any five of the following: 10

a) How the s-plan is mapped to z-plane in approximation of derivatives?
b) Explain interpolation by using block diagram.
c) Write the features of DSP processor.
d) Explain he mapping of impulse invariance method.
e) Explain any two properties of Butterworth filter.
f) What is pre-warping procedure?

Q.7 a) Explain the design of IIR filter by approximation of derivatives. 08
b) Use approximate of derivatives method to design digital IIR filter if the analog system function is $h(s) = \frac{1}{s+1}$ 07

Q.8 a) Explain product quantization, scaling, quantization error in computation of DFT. 08
b) Explain fixed point number, floating point number representation. 07

Q.9 a) Draw & explain architecture of $TMS320C67 \times\times$. 08
b) Compare between general purpose processor and DSP processor. 07

Q.10 a) Explain bilinear z-transform method for the designing of IIR filter. 07
b) Explain the advantages & disadvantages of digital filter. 08

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H-1410

Total No. of Printed Pages:3

SUBJECT CODE NO:- H-1410
FACULTY OF SCINECE AND TECHNOLOGY
T.Y. B.Tech. (ETC) (Sem-V)
Control System
(Revised)

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

Please check whether you have got the right question paper.

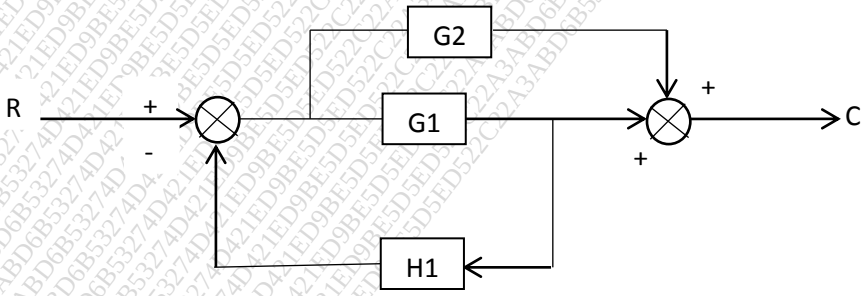
N.B
1) Q. No. 1 and Q. No.6 are compulsory.
2) Attempt any two questions from the remaining Questions in each section.
3) Figures to the right indicates full marks.

Section A

Q.1 Answer any five (05) of the following in Brief. 10

a) Differentiate between open loop control system & close loop control system?
b) What is signal flow graph?
c) Define non-touching loop?
d) For the transfer Function
$$G(S) = \frac{K(S+1)(S+2)}{S(S^3+2S^2+2S)}$$
What is the order & type of system?
e) How the system is classified depending on the value of damping?
f) Define steady state error, also enlist the error coefficients?
g) Give the procedure to find stability of a system using Routh's –Hurwitz criteria?

Q.2 a) Draw a signal flow graph for the block diagram below, Determine the overall transmittance? 08



b) Determine the rang of 'K' SO that the system is marginally stable and find the frequency of sustained oscillations. For the equation $S^4 + 25S^3 + 15S^2 + 2OS + K = 0$ 07

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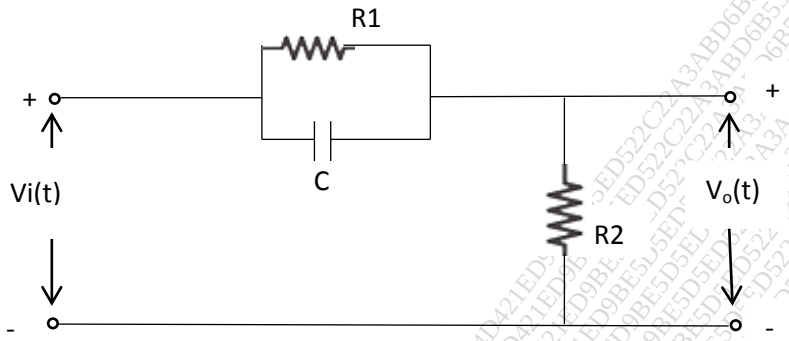
Q.3 a) Find out the transfer function of given electrical network Vo(S) / Vi(S): 08



b) Draw the approximate root locus diagram for a system having open loop transfer function. 07

$$G(S)H(S) = \frac{K}{S(S+5)(S+10)}$$

Q.4 a) What is position error coefficient (K_P), velocity error coefficient (K_v), acceleration error coefficient (K_a) and Steady state error (e_{SS}). Derive the expressions for these for type-2 system? 08

b) Derive the expression for underdamped response of the system of second order subjected to unit step input, i.e. 07

$$((t) = 1 - \frac{e^{-\xi\omega_{nt}}}{\sqrt{(1-\xi^2)}}\, Sin\left(\omega_n\sqrt{(1-\xi^2)}\; t + \tan^{-1}\frac{\sqrt{(1-\xi^2)}}{\xi}\right)$$

Q.5 Write short notes on (any three) 15

a) Characteristic equation
b) Block diagram reduction reduction rules.
c) Routh – Hurwitz stability criteria.
d) R.L.C. Network analysis

Section - B

Q.6 Answer any Five (05) of the following in brief. 10

a) What is Nyquist Stability Criteria?
b) How stability is defined based on information of gain & phase margin?
c) What is state variable & standard form of state model?
d) Using Bode plot, how stability can be determined?
e) Draw the state diagram for MIMO system?
f) What is PID Controller
g) What are the characteristics of ON/OFF Controller?

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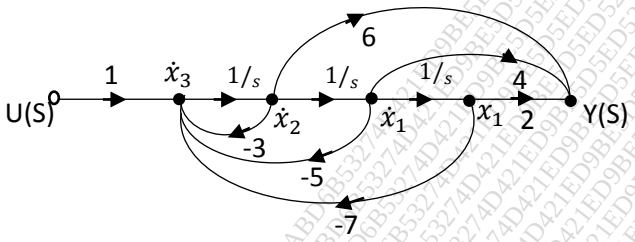
Q.7 a) For the transfer function 08

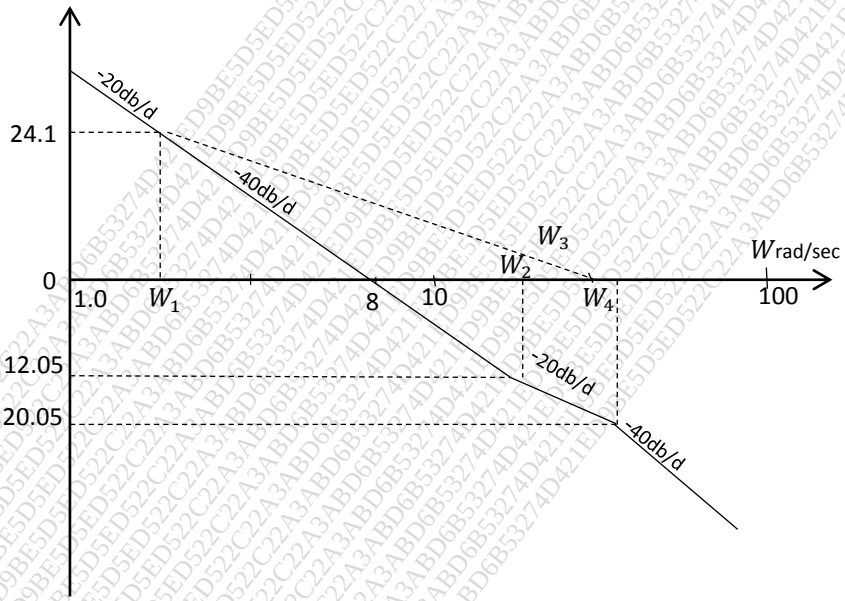
$$\frac{Y(S)}{U(S)} = \frac{2S+3}{S^2+5S+6}$$

Write the state model matrix equation?

b) For the signal flow graph below write the state model matrix equation. 07



Q.8 Determine the open – loop transfer function from the Bode plot shown? 15



Q.9 a) A unity feedback control system has 08

$G(S) = \frac{10}{S(S+1)(S+2)}$ Draw the Nyquist plot & comment on closed loop stability.

b) Obtain the solution for state equation (refer Q.9a) Transfer function) 07

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

a) Proportional controller
b) PID controller
c) Digital Control System
d) Polar Plot.

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Total No. of Printed Pages:01

SUBJECT CODE NO:- H-1421
FACULTY OF SCIENCE AND TECHNOLOGY
T.Y.B.Tech. (ETC) (Sem-V)
Elective-II Programming in JAVA
(Revised)

[Time: Two Hours] **[Max.Marks:40]**

Please check whether you have got the right question paper.

N.B
1. Question 1 and 5 are compulsory.
2. Attempt any two from remaining from each section.

Section A

Q.1 Attempt any three: 06
a) Define abstraction.
b) List 4 features of Java.
c) What is method overloading?
d) Define exception in Java.
e) List various types of inheritance.

Q.2 a) What are constructors, give examples. 03
b) Write program to show arithmetic exception handling in Java. 04

Q.3 a) Compare overloading and overriding. 03
b) What is abstract class give example? 04

Q.4 a) Write program of calculator in Java. 03
b) What is inheritance give example? 04

Section B

Q.5 Attempt any three 06
a) What of applet.
b) Define thread in Java.
c) Give example of interface in Java.
d) Why use packages in Java.
e) What is thread priority?

Q.6 a) Give life cycle of thread with diagram. 03
b) Compare interface and abstract class. 04

Q.7 a) Give life cycle of applet. 03
b) Give example of interface in Java. 04

Q.8 a) Write program to demonstrate multi – threading in Java. 03
b) Give application of applet. 04

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Total No. of Printed Pages:1

SUBJECT CODE NO:- H_1423
FACULTY OF SCINECE AND TECHNOLOGY
T.Y.B.Tech. (ETC) (Sem-V)
Elective-II Optical Fiber Communication
(Revised)

[Time: Two Hours] **[Max.Marks:40]**

Please check whether you have got the right question paper.

N.B
1. Q.No.1 and Q.No.5 are compulsory.
2. Solve any two questions from each section, from the remaining questions.
3. Assume suitable data if necessary.

Section A

Q.1 Solve any three 06
- a) Define Refractive index.
- b) What is total internal Reflection
- c) Enlist components of optic fibre.
- d) Enlist advantages of optical fiber communication

Q.2
- a) Explain electromagnetic spectrum. 03
- b) Draw block diagram of optical fiber system. 04

Q.3
- a) Which are the different types of optical fibre. 03
- b) Explain different types of dispersion. 04

Q.4
- a) What do you mean by coupling losses? 03
- b) Which are different types of coupling? 04

Section B

Q.5 Solve any three 06
- a) Enlist the sources of optics
- b) What do you mean by OTDR? Enlist application
- c) Enlist types of photo detector.
- d) Explain working principle of LED.

Q.6
- a) Explain the concept of power launching & coupling 03
- b) Compare between PIN diode & avalanche photo diode. 04

Q.7
- a) Explain SLED in detail. 03
- b) Explain digital link & its advantages. 04

Q.8
- a) Explain the different types of optical sources. 03
- b) Explain wavelength division multiplexing 04

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Total No. of Printed Pages:1

SUBJECT CODE NO:- H-1422
FACULTY OF SCIENCE AND TECHNOLOGY
T.Y.B.Tech. (ETC) (Sem-V)
Elective-II Microelectronics
(Revised)

[Time: Two Hours] **[Max.Marks:40]**

Please check whether you have got the right question paper.

N.B
1. Q.No.1 and Q.No.5 are compulsory.
2. Solve any two from the remaining questions from section 'A' and section 'B' each.
3. Assume suitable data wherever necessary.
4. Figures to the right indicate full marks.

Section A

Q.1 Solve any three from the following 06
a) Compare between PMOS, NMOS, CMOS?
b) Define LSI, MSI, VLSI, ULSI?
c) What is vapour deposition process in fabrication?
d) Draw only pass transistor circuit.

Q.2 Draw and explain VI characteristics of depletion & enhancement type MOSFET, explain various regions of it? 07

Q.3 With neat diagrams explain p-well type of CMOS fabrication. 07

Q.4 Explain NMOS inverter. 07

Section B

Q.5 Solve any three from the following 06
a) Define area capacitance with its proper unit?
b) Define sheet resistance with its proper unit?
c) Comment on 'Stick diagrams'?
d) Give the MOS layers details?

Q.6 Explain Latch up in CMOS circuits? 07

Q.7 Give Lambda based design rules for CMOS Technology? 07

Q.8 Explain the concept of structured design of combinational logic. Define circuit simulation. What is its use? 07

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Total No. of Printed Pages:02

SUBJECT CODE NO:- H-1438
FACULTY OF SCIENCE AND TECHNOLOGY
T.Y. B.Tech. (ETC) (Sem-VI)
Embedded System Design
[Revised]

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

Please check whether you have got the right question paper.

N.B
1) Q.1 and Q.5 are compulsory.
2) Attempt any two questions from section A and section B

Section A

Q.1 Attempt any five of the following 10
a) Give any four features of PIC18F4550
b) Draw status register format of PIC18 microcontroller.
c) Mention alternate functions of port c of PIC18F4550
d) What is function of TRIS register? How can any port configure as I/O using TRIS register?
e) What are data modifiers? Enlist them.
f) Write Initialization statement for LCD to work in 4 bit mode, 16x2
g) Enlist the registers used in PWM generation along with their functions.

Q.2 a) Draw PIC18 status register format and explain about each bit with proper example. 08
b) Draw and explain TOCON register. 07

Q.3 a) Compare assembly language programming with High level 'C' language. 08
b) Explain Basic data types and Data modifiers with proper examples. 07

Q.4 a) Enlist Sources of interrupts in PIC18 microcontroller. Draw and explain INTCON register. 08
b) Explain PWM generation using CCP module by mentioning specific registers used. 07

Q.5 a) Draw Interfacing of DC motor with PIC18. Write C18 program to control speed of DC motor using PWM. 08
b) Explain SPI bus protocol with neat diagram. 07

Section B

Q.6 Attempt any five of the following 10
a) Write following pin function of ATmega 328
i) MOSI ii) MISO iii) SCK iv) ICP1
b) Write any four features of ATmega 328
c) Enlist any four interrupt sources of ATmega 328
d) Give examples of each (any two)
i) Operators ii) Variables
e) Enlist alternate functions of port C for ATmega 328
f) Write different examples (versions) of Arduino boards

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g) Write specifications of (HC-SR04) ultrasonic sensor.

Q.7 a) Enlist operating modes of Timero (TCN To). Explain fast PWM mode in detail with neat diagram. 08

b) Explain serial port (USART) of ATmega 328. Draw frame format of USART and mention details of frame. 07

Q.8 a) Write a program to display 0 to 9 on 7 segment display using Arduino 08

b) Explain following data types in detail. 07
i) long ii) short iii) char iv) int

Q.9 a) Write an Arduino program to generate a delay using timer o 08

b) Draw and Explain interfacing of LCD with Arduino. Write a program to display 'HELLO' on LCD 07

Q.10 a) Draw and explain interfacing of DC motor with Arduino. Write a program to control speed of motor 08

b) Give the features of HC-05 Bluetooth module. Draw and explain interfacing diagram of arduino with Bluetooth. 07

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Total No. of Printed Pages: 02

SUBJECT CODE NO:- H-1445
FACULTY OF SCIENCE AND TECHNOLOGY
T.Y. B.Tech. (ETC) (Sem-VI)
Microwave Theory and Techniques
[Revised]

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

Please check whether you have got the right question paper.

N.B
1) Q. 1 and Q. 6 are compulsory
2) Solve any two questions from the remaining in each section
3) Assume suitable data if necessary.

Section A

Q.1 Attempt any five 10
a) What is waveguide? State its types.
b) What is the cut off wavelength of a rectangular waveguide having dimensions $2.5cm \times 1\ cm$
c) State the properties of S-Matrix
d) Write S matrix for 4 port circulator.
e) Define Insertion loss and coupling factor of directional coupler.
f) State the types of Attenuator.

Q.2 a) Why TEM mode does not exist in rectangular waveguide? Compare TE and TM modes. 08
b) A rectangular wave guide has dimensions $4\ cm \times 2\ cm$. If the operating frequency is 6 GHz, then calculate the following for the dominant TE mode. 07
1) Guide wavelength
2) Cut off wavelength
3) Phase velocity

Q.3 a) What is Magic Tee? Explain its applications. 07
b) Explain construction & working of two hole directional coupler with diagram. 08

Q.4 a) What is circulator? Analyze circulator using S-matrix 08
b) What is E-plane Tee? Analyze it using s- matrix. 07

Q.5 Write short notes on- 15
a) phase shifter
b) Strip lines
c) Isolator

Section B

Q.6 Attempt any five 10
a) Draw the characteristics of TRAPATT diode.
b) Define velocity modulation
c) What is the use of slow wave structure in TWT?
d) What is Gunn Effect?

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e) Draw the B. D of microwave bench.
f) Why magnetron is called as cross field (tube) device.

Q.7 a) Explain in detail operating modes of Gunn diode 08
b) Explain operation of schottky barrier dia with dia. 07

Q.8 a) Explain operation of Reflex klystron how it is working as an oscillator? Draw Applegate dia. 08
b) What are the limitations of conventional tubes of microwave frequencies? 07

Q.9 a) Draw & explain set up for VSWR measurement. 08
b) Explain phase shift measurement technique in detail with B.D. 07

Q.10 Write short notes on – 15
a) Measurement of Parameters
b) Cavity Magnetron
c) IMPATT Diode

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Total No. of Printed Pages:3

SUBJECT CODE NO:- H-1452
FACULTY OF SCINECE AND TECHNOLOGY
T.Y. B.Tech. (ETC) (Sem- VI)
VLSI Design
[Revised]

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

Please check whether you have got the right question paper.

N.B 1) Q.no.1 from section A and Q.no.6 from section B are compulsory.
2) Solve any two questions from remaining questions in each section.

SECTION – A

Q.1 Attempt any five: 10

a) Write entity for 2:4 decoder
b) What is VHDL?
c) Identify bug in following program entity design is

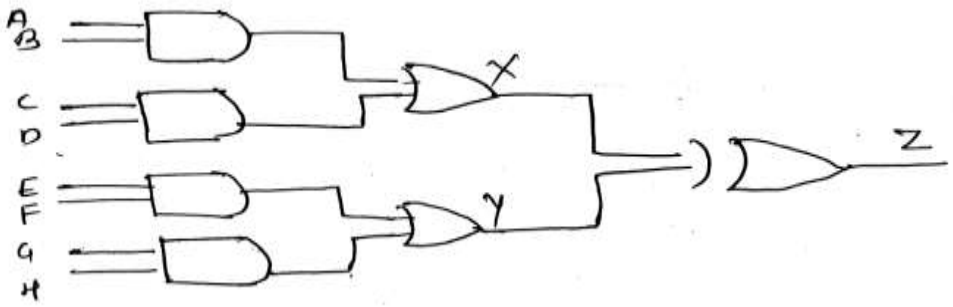
```
Port (a,b,c : in std- logic ;
      d: out std- logic – vector );
end gates ;
```

d) List sequential statements used in VHDL
e) What is a testbench?
f) Which are design constraints in VLSI

Q.2 a) Write syntax of case statement write VHDL code for 4:1 multiplexer using case statement 08
b) Write VHDL code for full adder. 07

Q.3 a) Describe delays used in VHDL 08
b) Describe data types used in VHDL. 07

Q.4 a) Write VHDL code for following design using behavioral modeling style. 08



b) Write a note on operators used in VHDL. 07

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Q.5 a) Write VHDL code for binary to grey code converter 08

b) What is Package declaration and Package body? 07

Section - B

Q.6 Attempt any five 10

a) List types of PLD's

b) Draw state diagram of D flip – flop

c) Write equation of moore machine

d) List simulation & synthesis tools

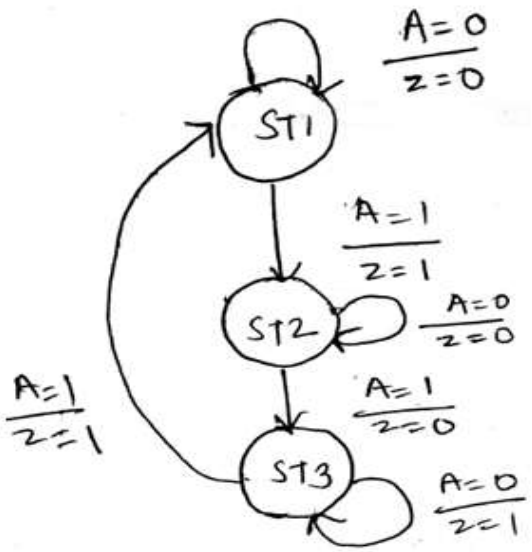
e) What is FSM?

f) Which are different element of ASM charts?

Q.7 a) Describe architecture of CPLD 08

b) Compare FPGA with CPLD 07

Q.8 a) Write VHDL code for following state diagram 08



b) What is optimization? Describe flattening & factoring process 07

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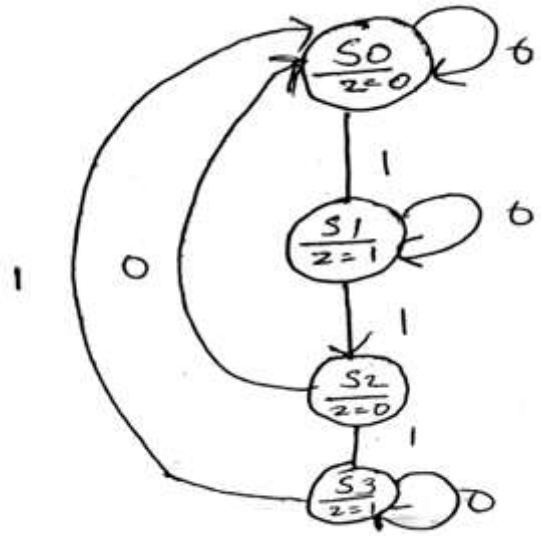
Q.9 a) Draw ASM chart for following state diagram 08



b) Describe simulation process in detail 07

Q.10 a) What is JTAG? Describe JTAG and TAP controller 08

b) Describe synthesis process in detail. 07

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Total No. of Printed Pages:2

SUBJECT CODE NO:- H-105
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (EC/ECT/IEC/E&C) (Sem-II)
Power Electronics
[OLD]

[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 the remaining questions in both sections.

Section A

Q.1 Solve any two. 10
a) Power MOSFET.
b) Compare the performance parameters of power MOSFET and IGBT.
c) What is ideal dual converter? Explain.
d) Explain ON-OFF control method.

Q.2 a) Explain the structure and different modes of operation with the characteristics of TRIAC. 07
b) Design UJT firing ckt with following data $\eta = 0.72, I_p = 0.6mA, Vp = 18.0V$ 08
$V_v = 1.0V,\ I_v = 2.5\ mA, R_{BB} = 5k\Omega$. Normal leakage current with emitter open = 4.2 mA.

Q.3 a) Explain single-phase AC voltage controller with R_L load. 07
b) Draw and explain the circuit diagram of 3-ϕ full converter with R-Load with neat voltage & current waveforms. 08

Q.4 a) Explain class-B commutation technique with neat circuit diagram and waveforms. 07
b) Design a dual converter to achieve a four- quadrant operation of the separately excited d.c. motor and converter specification are given by 08
i) Motor Specification
E_q = 220V, I_a = 30A, N = 1500 rpm.
ii) Converter specifications, supplied from 3 - ϕ, 400V, 50Hz supply. Assume drop in the circuit is 15%.

Q.5 a) What are the performance parameter of AC to DC converter in detail. 08
b) Explain cycloconverter? Its types state factor affecting the harmonics in cycloconverter. 07

Section B

Q.6 Solve any two of the following. 10
a) State voltage control techniques of inverter.
b) Explain with neat ckt. diagram working of class-B chopper.
c) State the principle of induction heating. What are its applications?
d) Write a short note on time delay ckt.

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Q.7	a)	Draw and explain the ckt diagram of 3-ϕ 120^0 mode inverter with neat circuit diagram and output waveforms.	08
	b)	Draw and explain operation of basic series inverter.	07
Q.8	a)	Explain the operation of voltage commutated chopper. Derive equations for commutating components.	08
	b)	Explain the operation of four-quadrant chopper.	07
Q.9	a)	Single – phase half bridge inverter has a resistive load of 10Ω and the center-tap dc input voltage is 96V. Compute – i) RMS value of the output voltage. ii) Fundamental component of the output-voltage waveforms. iii) Fundamental power consumed by the load. iv) RMS power consumed by the load.	08
	b)	Explain current commuted chopper with neat circuit diagram & waveforms.	07
Q.10	a)	Explain temperature controller with neat circuit diagram & waveforms.	07
	b)	With the help of neat circuit diagram. Derive the expression for minimum & maximum load current of class-A chopper.	08

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Total No. of Printed Pages:2

SUBJECT CODE NO:- H-125
FACULTY OF SCINECE AND TECHNOLOGY
T.E. (EC/ECT/E&C) (Sem-II)
Signal Coding & Estimation Theory
[OLD]

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

Please check whether you have got the right question paper.

N.B
1. Q .no. 1 and Q.no.6 are compulsory
2. Solve any two questions from in each section
3. Assume suitable additional data if necessary.

Section -A

Q.1 Solve any two 10

i) Explain Mutual information with its properties.
ii) Explain binary erasure channel.
iii) Explain source coding Theorem.

Q.2 a) What do you mean by channel capacity? State & explain channel capacity theorem. 07

b) Apply Shannon fano coding for following message ensamble 08

$$[X] = [x_1 \;\; x_2 \;\; x_3 \;\; x_4 \;\; x_5 \;\; x_6 \;\; x_7]$$
$$[P] = [0.45 \;\; 0.15 \;\; 0.1 \;\; 0.1 \;\; 0.08 \;\; 0.08 \;\; 0.04]$$

Q.3 a) Explain channel capacity of BSC 07

b) Find capacity of following channel whose channel matrix is 08

$$P(Y/X) = \begin{bmatrix} P & 1-P \\ 1-P & P \end{bmatrix}$$

i) Draw channel diagram.
ii) If sources are equally likely find probabilities of output if p=0.8
iii) Find capacity of the channel for P=0.8

Q.4 a) Prove the following relationship 07

$$I(X,Y) = H(X) - H(X/Y)$$

08

b) The Generator matrix for a (6,3) block code is given below. Find all code vectors of this code

$$G\begin{bmatrix} 1 & 0 & 0 & 1 & 0 & 1 & 1 \\ 0 & 1 & 0 & 1 & 1 & 0 & 1 \\ 0 & 0 & 1 & 1 & 1 & 1 & 0 \end{bmatrix}$$

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Q.5 a) Find out channel capacity of Binary erasure channel. 07

b) Explain Run length coding. 08

Section – B

Q.6 Solve any two (short notes) 10

i) Maximum likely hood estimation
ii) Encoder ckt for LBC
iii) Transform domain approach

Q.7 a) For a (7,4) cyclic code find out the generator matrix if $G(D)=1+D+D^3$ 07

b) Explain syndrome decoding of LBC. 08

Q.8 a) Explain procedure to obtain CRC. 07

b) Explain matrix description of convolution codes. 08

Q.9 a) Construct the (7,4) linear code word for the generator polynomial $G(D) = 1 + D^2 + D^3$ for the message bits 1001 07

b) Using generator polynomial $g(x) = 1 + x^2 + x^3$ generate the systematic & nonsystematic cyclic code words for the message vector 1011 08

Q.10 a) Explain 07

i) Tree diagram
ii) Trellies diagram

b) What is Estimation Theory? Explain any one method in detail. 08

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Total No. of Printed Pages:2

SUBJECT CODE NO:- H-160
FACULTY OF SCINECE AND TECHNOLOGY
T.E. (EC/ECT/IEC/E&C) (Sem-II)
Microcontroller & Advanced processors
[OLD]

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

Please check whether you have got the right question paper.

N.B
1. Q .no. 1 and Q.no.6 are compulsory
2. Answer any two Questions from Q.no.2 to Q.no.5 from section-A
3. Answer any two Questions from Q.no.7 to Q.no.10 from section-B.

Section -A

Q.1 Attempt any two of the following 10
a) Explain segment Register in 8086.
b) Explain conditional & control flags of 8086.
c) Explain minimum & maximum mode of 8086.

Q.2 a) Explain various addressing mode of 8086 with suitable examples. 07

b) Explain following signals of 8086. 08
i) $\overline{BHE}$
ii) $\overline{DEN}$
iii) $DT/\bar{R}$
iv) ALE

Q.3 a) Explain Interrupts of 8086. 08

b) Explain In details the stack of 8086. 07

Q.4 a) Explain interfacing of stepper motor with 8086. 08

b) Draw & describe the pin diagram of 8086. 07

Q.5 Short note on following (any three) 15
a) Conditional jump instruction
b) ADC interfacing with 8086
c) Assembler Directives
d) Interrupt service Routine

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Section – B

Q.6 Attempt any two of the following 10

a) Explain Addressing modes of 8051

b) Explain PSW of 8051 in details

c) Explain features of 80386.

Q.7 a) Explain the features of 80286. 07

b) Compare microprocessor & microcontroller. 08

Q.8 a) Explain the salient features of 8051. 08

b) Explain the salient features of Pentium 07

Q.9 a) Explain interrupt of 8051. 07

b) Explain the following 8051 instructions. 08

i) SWAP

ii) CLR C

iii) MUL AB

Q.10 a) Explain port – 3 of 8051 07

b) Explain Timers /counters of 8051 in details. 08

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Total No. of Printed Pages:2

SUBJECT CODE NO:- H-195
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (EC/ECT/IEC/E&C) (Sem-II)
Electronics System Design
[OLD]

[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 questions from Q.2 , Q.3 Q.4 & Q.5 in section A.
3. Solve any two questions from Q.7, Q.8, Q.9 & Q.10 in section B .
4. Figure to the right indicates full marks.
5. Use standard 5% tolerance resistance value =(10,11,12,13,15,16,18,20,23,24,27,30,36,39,43,47,51,56,62,68,75,82, 91) & standard cap value =(10,12,15,18,22,27,33,39,47,56,68,82) in design.
6. Assume suitable components & data which is necessary.
7. Design linear power supply must include circuit diagram selection of transformer rectifier diode, filter capacitor, capacitor at i/p & o/p terminal of pin 3 regulators protection diode etc.

Section A

Q.1 Solve any two 10

1) Discuss the various types & selection criteria in design for capacitors.
2) Explain the types & selection criteria for diode in an electronic system design.
3) Derive the output equation of op-amp based differentiator.
4) Write a note on : current to voltage amplifier.

Q.2 a) Explain op-amp characteristics in detail with equivalent circuit of op-amp. 07

b) Design differentiator circuit with ADC=20 to differentiate square waves input of 50KHz draw the input & output wave form one below the other. 08

Q.3 a) Design a regulated variable Dc power supply using LM317 with given specifications 07

$V_o = 3V \; to \; 20V$

Load current =0.5A

b) Write steps in designing of switching regulator using IC 78540 08

Q.4 a) Explain high current regulator . 07

b) List the features absolute maximum rating & electrical characteristics of IC temperature sensor LM35. 08

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Q.5 a) Design circuit for light intensity measurement by using photo diode. 07

b) Explain measurement of strain & working principle of strain gauge. 08

Section – B

Q.6 Solve any two 10

a) Explain electronic system design consideration & selection of material for enclosure .
b) Explain exponential law of reliability.
c) Explain PCB design rules for analog circuits .
d) Explain noise due to ground & supply line.

Q.7 a) What are different noises that occur in analog system? Give precautions for minimization of noises? 07

b) Discuss MTTR, MTBF, MTTF. 08

Q.8 a) Explain features of IC555. 07

b) Design a astable multivibrator using IC 555 with the following specifications . 08
Amplitude of square wave =8V

$$f_o = 4KHz$$

Duty cycle =60%
Draw the wave forms one below the other at pin nos 2,7,3

Q.9 a) Draw &explain block diagram of LM565. 07

b) Design mod -6 counter. 08

Q.10 a) Explain optocoupler & relay in electronic circuit. 07

b) Draw pin diagram of IC 7490 & explain in detail. 08

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Total No. of Printed Pages:2

SUBJECT CODE NO:- H-295
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (EC/ECT/IEC/E&C) (Sem-I)
Electromagnetic Engineering
[OLD]

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

Please check whether you have got the right question paper.

N.B
1. Questions No.1 and 6 are compulsory.
2. Answer any two questions from Q.no.2 to Q.no.5 from section A.
3. Answer any two questions from Q.no.7 to Q.no.10 from section B
4. Numbers shown in right side indicates full marks.
5. Assume suitable data if necessary.

Section A

Q.1 Answer the following questions in brief (any five) 10

a) What is a mathematical expression of divergence theorem?
b) Write table of dot product of unit vectors in Cylindrical and rectangular coordinate system.
c) What are the boundary conditions for perfect dielectric materials?
d) Write expression of potential difference in the field of point charge.
e) Write a Maxwell's first equation in electrostatics.
f) What is meant by current density and energy density?
g) Define Coulomb's law
h) State Gauss law for electrostatics?

Q.2 a) If a line charge $\rho_1 = 50nC/m$ is located along a line $x = 2m$, y=5m in free space, find an electric field intensity ($\bar{E}$) at point p(1,3,-4). 07

b) Derive the expression for electric field intensity for infinity line charge along the z-axis. 08

Q.3 a) I) If $\bar{A} = a_x \; at \; p(3,-4,5)$. Convert $\bar{A}$ in spherical component at P. 07
ii) If $\bar{B} = a_\theta \; at \; p(3,-4,5)$.Convert $\bar{B}$ in Cartesion components at P .

b) Four infinite sheets of charge are located as follows. 08
$20pC/m^2 \; at \; y = 7, -8pC/m^2 \;\; at \; y = 3 \; , 6pC/m^2 \; at \; y = 1 \; and \;\; 18pC/m^2 \;\; at$ Y=-4. Find $\bar{E}$ at point (2,6,-4).

Q.4 a) Explain concept of Potential Gradient in detail. 07

b) Two uniform line charge 8nC/m each located at x=1 , z=2 and at x= -1 , y=2 in free space. If the potential at the origin is 100V. find V at P(4,1,3). 08

Q.5 a) In cylindrical co-ordinates ,$\bar{J} = 10xe^{-100r}a_\Phi \; A/m^2$.find the current crossing the region $0.01 \leq r \leq 0.02$ and intersection of this region with Φ=constant plane . 07

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b) Find electric field density ($\bar{D}$) at P(6,8,-10) caused by (a) a point charge of 30mC at origin (b) a uniform line charge $\rho_1 = 40\mu C/m$ on the z axis. 08

Section – B

Q.6 Answer the following questions in brief (any five) 10

a) Define Stoke's theorem.
b) What are boundary conditions for static magnetic field?
c) Write Maxwell's equation in point form.
d) What are properties of good conductor?
e) What is Skin effect?
f) State Biot- Savart Law
g) What is Amper's Circuital Law?
h) Write the expression for capacitance?

Q.7 a) Given point A (1,2,4) , B (-2,1,3) and C(3,1,-2). Let a differential element with I=6A and $|dl|$ =10^{-4} m be located at A. The direction of dl is from A to B. find d$\bar{H}$ at C. 07

b) A current filament carrying 16A in $\bar{a}_z$directions lies along the entire Z axis. Find $\bar{H}$ in Cartesian coordinate at i) $A(\sqrt{}20,0,4)$ ii) B(2,-4,-4) 08

Q.8 a) Given the magnetic field $\bar{H} = 6\,r\,sin\phi\;a_r + 18\,r\sin\theta\;cos\phi\;a_\phi$. Evalute both sides of Stoke's theorem for the portion of the cone $\theta = 0.1\pi$ bounded by r=2, r=4 , $\phi = 0\;and\;\phi = 0.3\pi$. let the direction of dS be +$\bar{a}_\theta$ 07

b) What is force and torque on closed circuit? 08

Q.9 a) In a region where $\in_r = \mu_r = 1\;and\;\sigma = 0, let\;A = 10^{-3}y\cos(3*10^8t)\;cosz\;a_z Wb/m\;and\;V = 3*10^5 y\sin(3*10^8t) sinz\;V. find\;\bar{E}\;and\;\bar{H}.$ 07

b) Explain the concept of displacement current and displacement current density. 08

Q.10 a) Give a non- magnetic material having $\in_r = 2.25\;and\;\sigma = 10^{-4}\;mho/m.$ Find numerical values at 3.5MHz for i) loss tangent and ii) attenuation constant 07

a) A 9375 MHz uniform plane wave is propagating with $\in_r = 2.26\;and\;\mu_r = 1$.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 Impendence v) Propagation constant. 08

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Total No. of Printed Pages:2

SUBJECT CODE NO:- H-316
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (EC/ECT/IEC/E&C) (Sem-I)
Microprocessors & peripheral
[OLD]

[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) Answer any two Questions from Q.No.2 to Q.No.5
3) Answer any two Questions from Q. No.7 to Q. No.10.

SECTION– A

Q.1 Attempt any two of the following. 10
a) Draw & Explain Architecture of 8085.
b) Define & Explain concept of stack and subroutine.
c) Enlist Features of 8085.

Q.2 a) Draw & Explain pin diagram of 8085. 08
b) Write different addressing mode of 8085. 07

Q.3 a) WAP for 8085 to multiply two 8-bit numbers. 07
b) Compare & contrast memory mapped I/O with I/O mapped I/O. 08

Q.4 a) Explain following 8085 Instruction. 08
i) MVI R, data
ii) INR M
iii) ADC R
iv) JNZ
b) Explain need of I/O ports 07

Q.5 Write Short Note on following (Any three) 15
a) Stack Pointer in 8085.
b) Central Processing unit.
c) Counters
d) 8085 Interrupts.

SECTION – B

Q.6 Attempt any two of following 10
a) Explain 7 – segment Display.
b) Enlist feature of programmable Interval timer.
c) Compare the synchronous & Asynchronous data transfer.

Q.7 a) Draw & explain 8255. 08
b) Draw & explain block diagram of 8355. 07

Q.8 a) Explain voltage measurement by using 8085. 07
b) Draw& explain ADC interfacing with 8085. 08

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Q.9	a)	Explain Logic Analyzer with help of diagram.	08
	b)	Compare 8155 & 8355.	07
Q.10	a)	Explain how you will use 8155 times to generate a square wave.	08
	b)	Explain 8255 interfacing with 8085.	07

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Total No. of Printed Pages:02

SUBJECT CODE NO:- H-351
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (ECT/E&C) (Sem-I)
Digital Communication
[OLD]

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

Please check whether you have got the right question paper.

N.B
1. Question No 1 and Question No 6 are compulsory.
2. Solve any two questions from remaining questions in each section.

Section A

Q.1 Attempt any two from the following. 10
a) Explain the difference between analog and digital communication.
b) Write down the advantages and disadvantages of digital communication system.
c) State and prove sampling theorem in time domain.
d) What is quantization error? What is its maximum value? How can we reduce this error?

Q.2 a) Explain the working principle of PAM with mathematical equation, for the same. 08
b) Write in detail about the generation and reconstruction of PWM. 07

Q.3 a) A band limited signal $x(t)$ is sampled by a train of rectangular pulses of width τ and period T. 08
i) Find an expression for the sampled signal.
ii) Determine the spectrum of the sampled signal and sketch it. 07
b) Compare various sampling techniques.

Q.4 a) What is PCM? State salient features of PCM. Also state the advantages & drawbacks of PCM. 08
b) Explain the A –Law companding in detail. 07

Q.5 Write notes on 15
a) Review of Random variables and stochastic process.
b) The aperture effect
c) Concept of companding technique.

Section B

Q.6 Attempt any two from the following 10
a) What is Delta modulation? Explain.
b) What is Inter symbol interference? Explain.
c) Draw and explain the slow frequency hopping.
d) Explain the model of spread spectrum communication system.

Q.7 a) What is slop overload distortion and granular noise in Delta modulation? How it is removed? in adaptive Delta modulation? 08

b) Derive an expression for error probability of a matched filter. 07

Q.8 a) Draw the block diagram of QPSK transmitter and receiver and explain their working. 08

b) Compare ASK, PSK, FSK with reference to different parameters. 07

Q.9 a) How PN sequence relates with spread spectrum? Explain the chip system. 08

b) The direct sequence spread communication system has following parameters. 07

Data sequence bit duration $Tb = 4.095\ ms$

PN chip duration $Tc = 1\ \mu sec$

$\frac{Eb}{No} = 10$ for average probability of error less than 10^{-5}

Calculate processing gain and Jamming margin.

Q.10 Write notes on 15

a) Gaussian Nosie and its PDF

b) MSK generation

c) Applications of direct sequence spread spectrum signals

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Total No. of Printed Pages:02

SUBJECT CODE NO:- H-385
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (EC/ECT/IEC/E&C) (Sem-I)
Analog Integrated Circuit & Applications
[OLD]

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

Please check whether you have got the right question paper.

N.B
1. Q.no.1from section A and Q.no.6 from section B are compulsory
2. Solve any two questions from Q.no.2 ,3,4 and 5
3. Solve any two questions from Q.No.7 ,8,9,and 10

Section A

Q.1 Attempt any two 10
a) Define slew Rate and PSRR of op- amp. State the electrical characteristics of Ideal op-amp.
b) Draw and explain the operation of I to V converter.
c) Explain the operation of Zero crossing detector
d) Draw and explain the operation of phase shift oscillator using op-amp.

Q.2 a) Draw and explain the block diagram of op-amp. 08
b) Explain in detail the concept of virtual short and virtual ground. 07

Q.3 a) What is an Instrumentation amplifier? Draw and explain the operation of Instrumentation amplifier using three op- amp. 08
b) Derive the expression for output of summing and difference amplifier using op-amp. 07

Q.4 a) Explain the operation of sample and Hold circuit state applications. 08
b) What is window detector? Explain 07

Q.5 Write notes on 15
a) Bipolar and BICMOS
b) Voltage follower
c) ICLM339

Section B

Q.6 Attempt any two 10
a) Draw and explain the block diagram of PLL.
b) What is Butterworth filter? State application
c) Explain linear voltage regulator with neat circuit diagram.
d) What is VCO? Explain state application

Q.7 a) Design a High pass filter at a cut off frequency of 10KHz with pass band gain of 2. 08

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b) What is KRC filters? Explain. State applications 07

Q.8 a) Explain PLL as a frequency multiplier with the help of circuit diagram and input and output wave forms. 08

b) Define following terms for PLL 07
   i) Lock Range
   ii) Capture Range
   iii) Free Running frequency

Q.9 a) Draw and explain functional block diagram of IC 723 regulator. 08

b) What is Switching Regulator? List and explain four major components of the switching regulator. 07

Q.10 Write notes on 15
   a) All pass filter
   b) Adjustable Regulator ICLM317
   c) Transient Response of PLL

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Total No. of Printed Pages:2

SUBJECT CODE NO:- H-522
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (ECT/EC/E&C/IE) (CGPA) (Sem-I)
Electromagnetic Engineering
(Revised)

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

Please check whether you have got the right question paper.

N.B
i. Question No.1 and 6 are compulsory.
ii. Answer any two questions from Q. No.2 to Q. No.5 from Section A.
iii. Answer any two questions from Q. No.7 to Q. No.10 from Section B.
iv. Numbers shown in right side indicates full marks.
v. Assume suitable data if necessary.

Section A

Q.1 Answer the following questions in brief (Any five) 10

(a) A point 'P' is represented as P (2, 3, 1) in Cartesian coordinate system. Represent this point in equivalent cylindrical coordinate system.
(b) Consider the vectors, $A = a_x + a_y$ and $B = a_x + 2a_y + a_z$, determine $|B|$ and A•B.
(c) What is a Del operator?
(d) State Coulomb's law
(e) What are the applications of Gauss' law?
(f) Define a current density.
(g) Write expression of potential difference in the field of point charge.
(h) What are the boundary conditions for perfect dielectric materials?

Q.2 (a) Explain the concept of differential lengths, surfaces and volumes with a suitable diagram. 07
(b) What is divergence? State expressions for the divergence of a vector in Cartesian, Cylindrical and Spherical coordinates. Also, state the divergence theorem. 08

Q.3 (a) Derive the expression for electric field intensity for infinity sheet of charge. 07
(b) If a line charge $\rho 1 = 30$ nC/m, is located along a line x=3m, y=5m in free space, Find an electric field intensity (E) at point p(1,0,1). 08

Q.4 (a) Explain the concept of continuity of current and derive its necessary expression. 07
(b) If $E = -8xy\ a_x - 2x^2y\ a_y + a_z$ V/m, find the work done in carrying 6C charge from M(1, 8, 5) to N(2, 18, 6) along the path $y=3x^2 +z$, $z = x + 4$ 08

Q.5 (a) What do you mean by potential and potential difference? Deduce the expression for potential difference due to point charge. 07
(b) A point charge Q=10 nC is at origin in free space. Find electric flux density at P(1,0,1). 04
(c) What is position vector and unit vector? 04

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Section – B

Q.6 Answer the following questions in brief (Any five): 10

(a) State Biot-Savart law.
(b) Compare self and mutual inductance.
(c) What is Amper's circuital law?
(d) What is standing wave ratio?
(e) What is skin effect?
(f) Write expression for Poynting vector.
(g) What is meant by 'standing wave pattern'?
(h) State the conditions for distortionless transmission along lossy line.

Q.7 (a) Find the vector magnetic field intensity in Cartesian coordinates at P(1.5, 2, 3) caused by a current filament of 24 A in a_z direction on the Z axis and extending from a) z=0 tp z=6 b) z=6 to z=infinity. 07

(b) Derive boundary conditions for static magnetic field. 08

Q.8 (a) Explain Maxwell's equation in a point form and an integral form. 07

(b) A 9375 MHz uniform plane wave is propagating with $\epsilon_r = 2.26$ $\mu_r = 1$. 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 Impendence v) Propagation Constant. 08

Q.9 (a) Explain the different types of losses in transmission line 07

(b) A lossless transmission line of length of 100m has an inductance of 28μH and capacitance of 20nF. Find (i) propagation velocity (ii) phase constant at operating frequency of 100kHz and (ii) Characteristics impedance. 08

Q.10 (a) What is force and torque on closed circuit? 07

(b) Given a non-magnetic material having $\epsilon_r = 2.25$ and $\sigma = 10^{-4}$ mho/m. Find numerical values at 2.5 MHz for loss tangent. 04

(c) Explain Faraday's law? 04

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Total No. of Printed Pages:2

SUBJECT CODE NO:- H-529
FACULTY OF SCIENCE AND TECHNOLOGY
T.E.(ECT/EC/E&C/IE) (CGPA)(Sem-I)
Microprocessors And Microcontroller
(Revised)

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

Please check whether you have got the right question paper.

N.B
1. Q.No.1 and Q.No.6 are compulsory.
2. Answer any two questions from Q.2 to Q.5 from Section A.
3. Answer any two questions from Q.7 to Q.10 from Section B.
4. Numbers shown in right side indicates full marks.
5. Assume suitable data if necessary.

Section A

Q.1 Answer the following questions in brief (any five): 10

a) Mention the purpose of SID and SOD.
b) What is the function of accumulator?
c) Give the difference between JZ and JNZ?
d) Write instructions to enable all interrupts in 8085 microprocessor.
e) What is stack memory?
f) Write output control signal used in 8259A.
g) What are the different modes of 8255?
h) How does a keyboard interface to 8085 microprocessor

Q.2 a) List out different registers in 8085 microprocessor. Explain each register in detail with example. 07

b) Write an 8085 assembly language program (ALP) to multiply two 8-bit numbers stored in memory locations 7100H and 7101H. Store the result in memory locations 7200H and 7201H. Draw a neat flow chart. 08

Q.3 a) Enlist data transfer instructions of 8085 microprocessor. Explain any three with examples. 07

b) Draw and explain block diagram of 8255 in detail. 08

Q.4 a) Explain different addressing modes of 8085 microprocessor in detail. 07

b) Interface 8-bit DAC with 8085 microprocessor having port address FFH. Write a program to generate square wave using DAC. 08

Q.5 a) Draw and explain the timing diagram of memory READ cycle with example. 07

b) With the help of a neat block diagram, explain function of each block of 8251 USART. 08

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Section B

Q.6 Answer the following questions in brief (any five): 10

a) What are the advantages of a microcontroller over a microprocessor?
b) State function of any two SFR's in 8051?
c) Which are the timers and counters available in 8051?
d) What is the role of RXD and ALE pin in 8051?
e) Explain DIV AB instruction.
f) What is indexing in the 8051?
g) Calculate the period of machine cycle, if crystal frequency is 11.0592 MHz (in case of 8051).
h) What is SMOD register?

Q.7 a) Explain memory organization of 8051 in detail. 07

b) What are the addressing modes of 8051 microcontroller? Describe in detail. 08

Q.8 a) Explain interrupt structure of 8051 microcontroller in detail. 07

b) Design an 8051 microcontroller system to interface a 8KB of EPROM and 4KB of RAM. 08

Q.9 a) Write an 8051 assembly language program (ALP) to multiply content of external RAM locations 4000H and 4001H. Store the result at 4002H and 4003H locations. 07

b) With the help of a neat diagram, explain interfacing of ADC with 8051 microcontroller. 08

Q.10 a) With the help of a neat diagram, explain PSW of 8051 microcontroller. 07

b) With the help of a neat diagram, explain interfacing of stepper motor with 8051 microcontroller. Write an ALP to rotate a motor 64^0 in clockwise direction. The stepper motor has a step angle of 2^0. Use 4-step sequence. 08

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Total No. of Printed Pages:2

SUBJECT CODE NO:- H-536
FACULTY OF SCIENCE AND TECHNOLOGY
T.E.(ECT/EC/E&C/IE) (Sem-I)
Digital Communication
(Revised)

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

Please check whether you have got the right question paper.

N.B
1. Q.No.1 & 6 are compulsory.
2. Solve any two questions from remaining questions in both sections.

Section A

Q.1 Explain any two of following: 10
a) What is slope overload distortion and granular noise in delta modulation?
b) How the probabilities of statistically independent events are related with each other.
c) Explain random variable and random process.
d) Explain Baye's theorem.

Q.2 a) Draw and explain the block diagram of adaptive delta modulation. 08

b) A television signal having a bandwidth of 4.2 MHZ is transmitted using binary PCM system. The number of quantization levels is 512. Determine 07
i) Code word length.
ii) Transmission bandwidth.
iii) Final bit rate.
iv) Output signal to quantization noise ratio.

Q.3 a) Define probability? Explain conditional and joint probabilities. 07
b) Explain in detail normal distribution probability models. 08

Q.4 a) Explain stationary and non-stationary random processes. 07

b) A three digit message is transmitted over a noisy channel having a probability of error as $P(E) = \frac{2}{5}$ per digit. Find out the corresponding CDF. 08

Q.5 a) Explain in detail with working and diagram of differential pulse code modulation. 08
b) Define joint probability density function? State and prove properties of same. 07

Section B

Q.6 Explain any two of the following: 10
a) What is Gray line coding?
b) Explain FSK system in brief.
c) Explain the method to generate a PN sequence.

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d) Sketch the QPSK waveform and find the transmitted phase sequence for the input binary sequence = 0110100.

Q.7 a) Derive an expression for error probability of matched filter. 07

b) What is white Gaussian noise? What is effect of Gaussian noise on bipolar signal? How to use the PDF curve. 08

Q.8 a) Draw and explain generation and detection of differential phase shift keying 08

b) Compare FSK, PSK, QPSK in detail. 07

Q.9 a) With the help of neat block diagram explain now DSSS signals are generated and detected. 08

b) Explain frequency hopping in detail. 07

Q.10 a) Calculate the impulse response for the matched filter. 07

b) Draw and explain coherent detection of BPSK. 08

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Total No. of Printed Pages:2

SUBJECT CODE NO:- H-543
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (ECT/EC/E&C/IE) (Sem-I)
Digital Signal Processing
(Revised)

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

Please check whether you have got the right question paper.

N.B
1. Q.No.1 & 6 are compulsory.
2. Attempt any two questions from remaining questions from section A and section B respectively.

Section A

Q.1 Attempt any two 10
1. Inverse z transform using power series method
2. Relations between Laplace & Z transform
3. Techniques for avoiding aliasing
4. DIT FFT Algorithm

Q.2 a) State and prove any four properties of z-transform. 08

b) Determine z-transform of following 07
1. $x(n) = \{\underset{\uparrow}{1},2,5,7,0,1\}$
2. $x(n) = \delta(n)$
3. $x(n) = u(n)$

Q.3 a) Find Fourier transform of $x(n) == e^{-an}, u(n)$ 08

b) Determine IDFT of 07
1) $X(K) = \{\underset{\uparrow}{2}, 1+j, 0, 1-j\}$
2) $X(K) = \{\underset{\uparrow}{2}, 2+2j, -2, 2-2j\}$

Q.4 a) Draw block diagram of DSP and explain its advantages & disadvantages. 07
b) Explain realization forms of IIR structure. 08

Q.5 a) Determine inverse z-transform using PFE method. 08
1) $X(z) = \frac{z}{(z-1)(z-2)}$
2) $X(z) = \frac{1}{(z^2-z+1)(z-2)}$
b) Explain overlap add method. 07

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Section B

Q.6 Attempt any two 10

1. FIR filter using rectangular window
2. TMS 3200 XX DSP processor
3. Impulse invariance method for IIR filter
4. Quantization noise

Q.7
a) Explain FIR filter design using frequency sampling technique. 07
b) State and explain design steps for FIR filter. 08

Q.8
a) Explain limit cycles oscillations in recursive system. 07
b) Explain quantization by truncation & rounding. 08

Q.9
a) Design second order digital Butterworth filter with cut off frequency 1 KHz and sampling frequency 10^4 samples/sec. use Bilinear transformation method. 08

b) Explain design of IIR filter using approximation of derivatives method 07

Q.10
a) Compare general purpose processor and DSP processor. 08
b) Explain frequency transformation in digital filter. 07

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Total No. of Printed Pages:2

SUBJECT CODE NO:- H-550
FACULTY OF SCIENCE AND TECHNOLOGY
T.E.(ECT/EC/E&C/IE) (CGPA)(Sem-I)
Elective-I Programming In Java
(Revised)

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

Please check whether you have got the right question paper.

N.B i) Q.No.1 & 6 are compulsory.
ii) Answer any two questions from remaining questions each from section A and B.
iii) Figures in right column indicates full marks.

Section A

Q.1 Answer the following in brief. (any five) 10
a) What are the advantages of object oriented programming?
b) Differentiate between array and vector.
c) What is constructor?
d) What is the purpose of Alive ( ) function in Java?
e) What is difference between Abstract class and Wrapper class?
f) What is meant by exception in Java?
g) State examples of throws.
h) What is Try catch finally mean?

Q.2 a) Explain briefly the following object oriented concepts: i) Abstraction ii) Polymorphism. 07
b) How packages differ from Interfaces? Explain it with a suitable example. 08

Q.3 a) What are the different forms of inheritance? Explain. 07
b) What are the various types of exceptions available in Java? Explain with examples. 08

Q.4 a) Explain about exceptions as objects in detail. 07
b) Write a Java program to interchange the rows and columns of a given matrix. 08

Q.5 a) Explain the various types of operators and expressions used in Java. 07
b) Write short note on – Super Access control. 08

Section B

Q.6 Answer the following in brief. (any five) 10
a) What is meant by 'Object Serialization"?
b) What is difference between Input and Output streams?
c) Differentiate between sleep ( ) and wait ( ).
d) What is daemon thread?
e) Define – Thread Life Cycle.
f) What is meant by multithreading?
g) "Java class can be used both as an applet as well as an application". Justify the statement.
h) List the features of swings.

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Q.7	a)	Write a Java program that prints numbers from 1 to 10 line by line after every 5 seconds.	07
	b)	Explain how communication between threads takes place with a programming example.	08
Q.8	a)	Explain various thread states and properties in detail.	07
	b)	Explain any two AWT controls in Java with suitable examples.	08
Q.9	a)	Explain action event with suitable example.	07
	b)	Explain filter and pipe streams with example.	08
Q.10	a)	"Threads can be given priorities"- support this statement with suitable examples.	07
	b)	Write an applet program that has different shapes in it.	08

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Total No. of Printed Pages:2

SUBJECT CODE NO:- H-551
FACULTY OF SCIENCE AND TECHNOLOGY
T.E.(ECT/EC/E&C/IE) (Sem-I)
Elective-I Information Theory And Coding
(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) Answer any two questions from remaining questions each from section A and section B.
iii) Assume suitable data, if necessary.

Section A

Q.1 Answer the following in brief. (any five) 10

a) What is meant by conditional self-information?
b) Consider a DMS with source probabilities {0.30, 0.25, 0.20, 0.15}. Find the source entropy.
c) Define "maximum distance" of a linear block.
d) What is meant by "Syndrome decoding"?
e) What are the types of hamming codes?
f) What are the applications of Cyclic codes?
g) State example of fire codes?
h) What is CRC? Where does it appear in communication system?

Q.2 a) For BSC when x_1 is transmitted and y_1 received the probability is 0.9, when x_2 transmitted and y_2 received the probability 0.8, similarly when x_1 is transmitted and y_2 received the probability is 0.1and x_2 transmitted and y_1 received the probability is 0.2. 08

i. Find channel matrix
ii. Find $P(y_1)$ and $P(y_2)$ when $P(x_1)=P(x_2)=0.5$
iii. Find the joint probabilities P(x,y) when $P(x_1)=P(x_2)=0.5$.

b) List out the properties of linear block codes. Explain with examples. 07

Q.3 a) For a (6,3) linear block code, the coefficient matrix [P] is as follows: 08

$$P = \begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \end{bmatrix}$$

The received codeword at the receiver are i) 001110 ii) 111011
Check whether they are correct or contain error?

b) The generator polynomial of a (7,4) cyclic code is $G(D) = D^3 + D + 1$, find all code vectors for the code in systematic form. 07

Q.4 a) Explain in detail about Golay codes. 08
b) Explain Shannon-Fano algorithm with one example. 07

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Q.5 Write short notes on: 15

a) Channel models
b) Matrix description of linear block codes
c) Burst error correction

Section B

Q.6 Answer the following in brief. (any five) 10

a) What is Kraft in equality?
b) Why BCH codes are called "t-error correcting codes"?
c) Define RS code.
d) What is code rate and block length in case of convolution codes?
e) What is basic difference between convolution code and block code?
f) What is meant by "Turbo coding"?
g) What are the masking techniques?
h) What are the coding/ decoding techniques used in speech signals?

Q.7 a) Explain the iterative procedure for decoding of BCH codes. 07

b) Demonstrate the Viterbi algorithm for maximum likelihood decoding of convolution codes. 08

Q.8 a) What do you understand by trellis diagram of convolution encoder? Explain clearly. 07

b) Explain LZW algorithm in detail. 08

Q.9 a) Explain Psycho acoustic model with neat diagram. 07

b) Explain application of RS codes and formation of RS codes with examples. 08

Q.10 Write short notes on: 15

a) Nested codes
b) Tree codes
c) Predictive coding

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Total No. of Printed Pages:2

SUBJECT CODE NO:- H-552
FACULTY OF SCIENCE AND TECHNOLOGY
T.E.(ECT/EC/E&C/IE) (Sem-I)
Elective-I Computer Architecture And Operating System
(Revised)

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

Please check whether you have got the right question paper.

N.B
1) Q.No.1 and Q.No.6 are compulsory.
2) Answer any two questions from the remaining questions each from section A and B.

Section A

Q.1 Answer the following in brief (any five) 10

a) Define parallel processing.
b) What is necessity of high performance in computer systems?
c) What are future trends in computer architectures?
d) What is meant by data buffering?
e) What is the function of Register stack engine?
f) What is software pipelining?
g) What are architectural difference between single core and dual core computers?
h) State any two salient features of Pentium processor.

Q.2
a) What are the performance metrices and measures of scable processors? 07
b) Explain pipelining hazards and their resolving techniques. 08

Q.3
a) Give the classification of pipelining processors. Explain in brief. 07
b) Present the case study of Intel Itanium Processor. 08

Q.4
a) Explain Explicitly Parallel Instruction Computing (EPIC) in detail with its architecture. 07

b) What are the constraints of conventional architecture of processors? How parallel processors are evolved? 08

Q.5 Write short notes on: 15

a) Instructional level parallelism
b) General pipelining reservation table
c) Ultra SPARC

Section B

Q.6 Answer the following in brief (any five) 10

a) What is an Operating System?
b) What is the function of an assembler and compiler?
c) What is meant by ‘Virtual Machine?
d) What is Round-Robin scheduling?

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e) What is a semaphore? What are its drawbacks?
f) What is critical section in OS?
g) What is memory management?
h) What are the page replacement algorithms?

Q.7 a) Give the detail classification of Operating System? 07

b) Explain following terms in brief: 08
i) Process
ii) Process state
iii) Process switch
iv) Process management

Q.8 a) Explain about the inter process communication in detail. 07
b) Explain the concept of memory partitioning with example. 08

Q.9 a) What is paging? How it works in CPU? How does the OS keep track of such pages? 07

b) Explain following terms in context to Operating System. 08
i) Time sharing
ii) Spooling
iii) Multitasking
iv) Multiprogramming

Q.10 a) Explain the concept of I/O manager in Operating System in detail. 07
b) Write a short note on- Wait and signal procedures. 08

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Total No. of Printed Pages:3

SUBJECT CODE NO:- H-565
FACULTY OF SCIENCE AND TECHNOLOGY
T.E.(ECT/EC/E&C/IE) (Sem-II)
Embedded System
[REV]

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

Please check whether you have got the right question paper.

N.B
i) Question No. 1 and 6 are compulsory.
ii) Answer any two questions from Q.No.2 to Q.No.5 from Section A.
iii) Answer any two questions from Q. No.7 to Q. No. 10 from Section B.
iv) Numbers shown in right side indicates full marks.
v) Assume suitable data if necessary

Section – A

Q.1 Answer the following questions in brief (Any five): 10

(a) Fill in the blanks by choosing a correct option from the square bracket and rewrite the following statements underlining the option: PIC18F458 has on-chip program ROM of ----------[32K / 16K] size and ----------[256 / 1536] bytes on-chip data RAM. It has-------[34 / 36] pins for I/O and ----------[28 / 40] DIP pin package.

(b) Fill in the blanks by choosing a correct option from the square bracket and rewrite the following statements underlining the option: The file register data RAM in PIC is divided into two sections as-------- [SFR / WREG] and ---------- [GPR / EEPROM]. The file register space in PIC 18 is divided into ----------[16 / 256] bytes banks and can be maximum of ----------[8 / 16] banks.

(c) What are the options available for clock source in PIC 18 family?

(d) State any two comparative points between programming in C and programming in assembly language, in context to PIC μC.

(e) Write a short program (Using C programming) that toggles all bits of PORT-D.

(f) State the CAN controller which can be interfaced to PIC and what are its important pins which can be used for interfacing to PIC?

(g) What are basic characteristics of I^2C communication? State anytwo specifically.

(h) What is meant by CCP? Which are the three registers associated with each CCP module?

Q.2 a) Explain the memory organization and its types in PIC 18. 08
b) What are the data types in context to Embedded Programming in C 07

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Q.3 a) Write a test program for the PIC 18 to generate a frequency of 5 Hz only on pin PORTB.5. Use Timer0, 8-bit mode to create the delay. 08

b) Explain the 'if-else' and 'while' loops with suitable example and sample program in C and in context to PIC embedded system. 07

Q.4 a) List all the ports of PIC 18F4550. With the schematic pin diagram, explain I/O port pins and their functions. 08

b) Draw a typical connection showing interface of LCD (8-bit) and PIC 18 µC. Explain few instruction command codes for communication between them. 07

Q.5 Write short notes on: 15

(a) Modifiers in embedded C programming
(b) Interrupt legacy and priority
(c) RTC (DS1306)

Section – B

Q.6 Answer the following questions in brief (Any five): 10

(a) Fill in the blanks by choosing a correct option from the square bracket and rewrite the following statements underlining the option: The Arduino Uno board has -----[two / only one] hardware serial port, which is generally refereed as -------[USART / PWM]. It is connected through ----------[0&1 / 2&3] pins on board and use-------[USB / non – USB] connectivity.

(b) Who is/are original developer of Arduino board? What does 'UNO R3' mean?

(c) State the timers and their bit capacity in Arduino Uno.

(d) What does the = =, ! =, - = and * = operator indicates in C programming?

(e) What is a sketch structure?

(f) State few commands related to analog and digital I/0 in Arduino programming.

(g) List the pins of Bluetooth HC-05.

(h) What are the SPI communication modes?

Q.7 a) Explain the basic programming commands (related to Arduino) with suitable examples for following categories: (i) time (ii) math (iii) random and (iv) serial. 08

b) Draw and explain the Arduino Uno R3 architecture. 07

Q.8 a) Explain the Arduino programming for interfacing seven segment display. You can focus little on purpose of interfacing and more on programming part. 08

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b) Explain about PWM and ADC feature of Arduino/AT mega 328 microcontroller in detail. 07

Q.9 a) Explain various 'Constants' used in Arduino basic programming with a suitable example of each. 08

b) State functions of general pins and special pins available in Arduino Uno R3. Not necessary to draw a Pin diagram. 07

Q.10 Design an Arduino UNO R3 based embedded system for interfacing 'wifi ESP8366' and IR sensor to a single board. The design expects the focus on following: 15

- Wiring diagram or schematic pin connections between Arduino and interfacing device.
- Writing a program in C language to achieve the task (this can be generalized operation expected as outcome of interfacing devices)
- Specific explanation at the end of program to interpret the written lines/code in C language.

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H-572

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-572
FACULTY OF SCIENCE & TECHNOLOGY
T.E.(ECT/EC/E&C/IE) (CGPA) (Sem-II)
Feedback Control System
[REV]

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

Please check whether you have got the right question paper.

N.B. 1) Q. No. 1 and Q. No. 6 are compulsory.
2) Solve any two questions from remaining in Section A and B each.

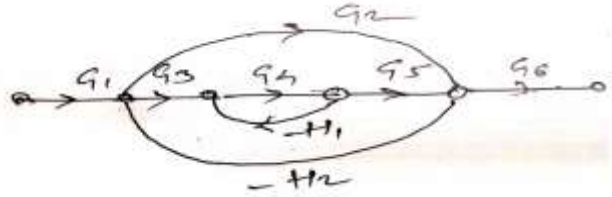
Section A

Q.1 Solve any five given below: 10

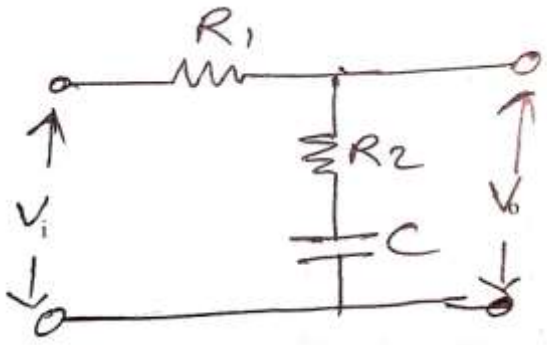
a) Define feedback control system.
b) Define deterministic system.
c) Enlist advantages and disadvantages of open loop system.
d) What do you mean by closed loop control system?
e) Explain time varient system with a example.
f) Give statement of Masons Gain formula.

Q.2 a) Write a note on system analogy of Mechanical System & electrical system. 07

b) Find $\frac{C(S)}{R(S)}$ 08



Q.3 a) Find the transfer function of given network. 08



b) Explain standard test input signals. 07

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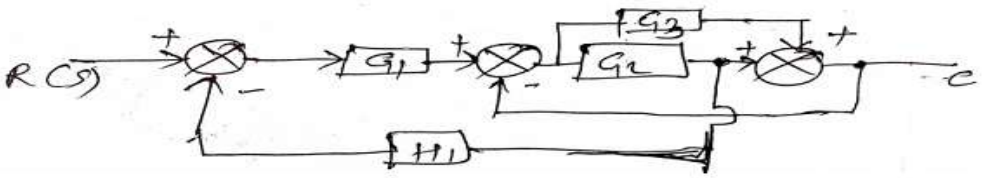
Q.4 a) Determine the transfer function $\frac{C(S)}{R(S)}$ from the block diagram shown in the figure. 08



b) Explain any five rules for block diagram reduction. 07

Q.5 a) For unity feedback system having $G(S) = \frac{10(S+1)}{S^2(S+2)(S+10)}$ 07

Determine the types of system.

b) Determine error coefficient and steady state error for input as $1 + 4t + \frac{t^2}{2}$ 08

Section B

Q.6 Solve any five from given below: 10

a) What do you mean by Gain Margin?
b) Define phase margin.
c) Define controllability of system.
d) Define observability of system.
e) What do you mean by state variable?
f) What is state space Analysis?

Q.7 Discuss the stability of the system using Nyquist criterion for system with open loop transfer function. $G(S)H(S) = \frac{10}{S^2(1+0.25S)(1+0.5S)}$ 15

Q.8 a) Write a Notes on frequency domain specification. 07

b) Draw the Bode diagram for 08

$$G(S) = \frac{100(0.02S + 1)}{(S + 1)(0.1S + 1)(0.01S + 1)^2}$$

Q.9 a) Explain the advantages of Routh's criteria. 07

b) Examine the stability of Routh's criteria. 08

$S^4 + 6S^3 + 26S^2 + 56S + 80 = 0$

Q.10 a) What are the advantages of state space analysis? 07

b) Distinguish between conventional control theory & Modern control theory. 08

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Total No. of Printed Pages:2

SUBJECT CODE NO:- H-579
FACULTY OF SCIENCE AND TECHNOLOGY
T.E.(ECT/EC/E&C/IE) (Sem-II)
Power Electronics and Drives
[Revised]

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

Please check whether you have got the right question paper.

N.B.: 1) Question No.1 from Section A & Question No.6 from Section B are compulsory.
2) Attempt any two questions from remaining questions of Section A and B each.

SECTION– A

Q.1 Explain any Five of following 10

a) Define Latching and holding current of SCR.
b) What is GTO? Draw it's structure and symbol.
c) Give the important features of IGBT.
d) What is Dual Converters?
e) List out power factor improvement techniques of converter.
f) What is step-up cycloconverter.
g) Define ON-OFF control in A.C.voltage controller.

Q.2 a) Explain with the help of structure, neat diagram and V-I characteristics of TRIAC. 08

b) For an SCR the gate-cathode characteristic has a Vs=10V, a straight line slope of 3×10^3 and allowable gate power dissipation of 0.012W. Calculate the required gate source resistance. 07

Q.3 a) Explain the operation of single phase full controlled converter with R-L load. Draw waveform for $\propto = 60°$. 07

b) A 3-Ø half wave converter is operated from a 3-Ø Y – connected 220V, 50 Hz supply and resistance is R=10Ω. If the average O/P voltage is 25% of the maximum possible average voltage, Determine i) Delay angle ii) RMS and average O/P current iii) Average and rms thyristor currents iv) Rectification efficiency v) Transformer utilization Factor vi) I/P Power Factor. 08

Q.4 a) Explain the operation of single-phase to single phase cyclo converter with R and RL Load with waveform. 08

b) An A.C. voltage controller has a resistive Load of $R = 10\Omega$ and rms input voltage is $VS = 230V$, 50 Hz. The SCRs are switched on for n=25 cycles and off for m=75 cycles. Determine i) RMS O/P voltage ii) input power factor iii) Average and rms current rating of SCRs. 07

Q.5 a) Explain different communication techniques used for SCR with circuit diagram and waveforms. 08

b) Explain the significance of Load and Source inductance on the performance of single phase converter. 07

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SECTION – B

Q.6 Explain any five from following. 10

a) Define CSI.
b) List out Limitation of series inverter.
c) Compare series and parallel inverter.
d) What is two quadrant chopper?
e) What is TRC techniques in Chooper?
f) List out various Applications of HF heating.
g) What is power module?

Q.7 a) Explain the working of power circuit for 180° mode 3 - ∅ bridge inverter with waveforms. 07

b) Design a series inverter for operation in the frequency range of 1 – 5 KHZ. The load resistance varies from 20Ω to 80Ω. The peak load current is limited to 4A and supply voltage is 95V. 08

Q.8 a) Obtain the expression for minimum and maximum current of class A chopper. 07

b) A battery driven vehicle is controlled by a voltage commutated chopper. The battery voltage is 200V and starting current is 125A. Thyristor turn-off time is 20µsec. Chopper frequency is 200Hz. Calculate the value of commutating capacitor and inductor. 08

Q.9 a) Explain Ring counter with neat circuit diagram and waveforms. 08

b) Explain servo controlled voltage stabilizer. 07

Q.10 a) Explain basic principle of a set-up chopper. Obtain the expression for output voltage. 07

b) What are the methods for voltage control of inverters? Explain any one in detail. 08

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Total No. of Printed Pages:2

SUBJECT CODE NO:- H-586
FACULTY OF SCIENCE AND TECHNOLOGY
T.E.(ECT/EC/E&C/IE) (CGPA) (Sem-II)
Electromagnetic Circuit Technology
[Revised]

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

Please check whether you have got the right question paper.

N.B i) Q 1 and Q 6 are compulsory.
ii) Solve any two questions from remaining in each section.
iii) Use standard 5 % tolerance resistance values (10, 11, 12, 13, 15, 16, 18, 20, 22, 24, 27, 30, 36, 39, 43, 47, 51, 56 , 62, 68, 75, 82, 91) &
standard capacitance values=(10,12,15,18,22,27,33,39,47,56,68,82) in design.
iv) Assume suitable data if necessary and mention it clearly.

SECTIONA

Q.1 Solve any 5 10

a) List the criteria for selecting resistors in design.
b) Give specifications of diode IN4007.
c) Draw a block diagram of DC regulated power supply.
d) Why is Overvoltage protection provided in voltage regulator.
e) Necessity of filter in DC Power supply.
f) Draw the VI characteristic of photo diode.

Q.2 (a) Design a regulated variable DC power supply using LM 317 with given specifications: Vo = 3 V to 20 V, Load current =0.5 A. 07
(b) Design step down switching regulator using 78S40 with the following specifications: Input voltage = 12 V dc, Output voltage =5V at 500 mA maximum
Output ripple voltage=50 mV. 08

Q.3 (a) Using an op amp design a grounded load voltage to current amplifier with the following specifications: $I_o = V_i/1\ k\Omega$. Also find the voltage compliance. 07
(b) What is necessity of instrumentation amplifier? Draw and explain an instrumentation amplifier using three op amps. Derive an equation for gain. 08

Q.4 (a) List the features, absolute maximum ratings and electrical characteristics of IC temperature sensor LM 35 07
(b) Design a ambient light measurement circuit by photo transistor & op amps. 08

Q.5 (a) Design a Wein bridge oscillator to generate a sinusoidal waveform for a output frequency of 5000 Hz. 07
(b) Design using OpAmp a first order low passbutterworth filter with a cut-off frequency of 1000 Hz and passband gain of 10 08

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SECTION B

Q.6 Solve any 5 10

a) List PCB design rules for Analog circuits.
b) Explain the importance of grounding and shielding.
c) Define Finite State machines
d) Define MTTR
e) What is a need of heat sinks?
f) Draw block diagram of Data Acquisition System.

Q.7 (a) Design a astable multivibrator using IC 555 with following specifications: 08
Amplitude of square wave = 8 V ,f_o = 4 kHz, Duty cycle = 25%.
(b) List and explain specifications of ADC. 07

Q.8 (a) Explain interfacing of relay to digital circuits by drawing a neat circuit diagram. 07
(b) Design a circuit to interface a single digit seven segment display with microcontroller. 08

Q.9 (a) Describe various design considerations to ensure reliability of an electronic product. 07
(b) Find out the failure rate if 10,000 microcontroller chips are operated for a period of 1000 hours out of which 10 fail. 08

Q.10 (a) Discuss the considerations for selection of material for enclosure 07
(b) What is ground loop? How is it minimized? 08

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Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1005
FACULTY OF SCIENCE AND TECHNOLOGY
T.Y. B.Tech. (ETC) (Sem-VI)
Microcontroller & Embedded System
[Old]

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

Please check whether you have got the right question paper.

N.B i) Q.No.1 and 6 are compulsory.
ii) Attempt any two questions from remaining in each section.
iii) Assume suitable data, if necessary.

Section A

Q.1 Answer any five. 10

a) Explain pin function of $\overline{PSEN}$ 89C51.
b) Give the selection criteria for microcontrollers.
c) Explain the instruction 'ACALL' in 8051.
d) Give the standard specification of RS232.
e) List the types of interrupts in 8051 microcontrollers.
f) How many times are used in 8051. Explain one in detail.

Q.2 a) Discuss with neat diagram architecture of 89C51. 08
b) Explain with neat diagram and example ADC with 89c51. 07

Q.3 a) Explain in detail 89c51 ports. 08
b) Explain external data transfer instructions in 89C51 with examples. 07

Q.4 a) Explain in detail selection criteria for microcontroller with example. 08
b) Explain design process in embedded system. 07

Q.5 a) Discuss flash programming in 89C51. 08
b) Explain in detail the interrupts of 89C51. 07

Section B

Q.6 Attempt any five of the following. 10

a) Compare Assembly language with high level language with any four points.
b) Explain in short unsigned character and signed character.
c) Compare general purpose operating system with real time operating system. (any two)
d) What is interrupt latency?
e) Enlist any three functions of memory management.
f) What is header file used in 'C' language.

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Q.7	a)	Draw and explain interfacing of DAC with 8051. Write an ALP to generate saw-tooth waveform using DAC.	08
	b)	With neat diagram explain interfacing of stepper motor with 8051. Write a program to rotate stepper motor clockwise continuously.	07
Q.8	a)	Give the features of RTOS.	07
	b)	Explain memory management used in RTOS.	08
Q.9	a)	Explain Task and Task scheduling.	07
	b)	Write an 8051 C program to toggle all the bits of P_o and P_2 continuously. With a 250msec dealy.	08
Q.10	a)	Give the features of micro/os-II.	07
	b)	Explain Embedded system in Automobile.	08

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