

Total No. of Printed Pages:2

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

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

N.B Please check whether you have got the right question paper.
 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
 i) Step down cycloconverter.
 ii) Power IGBT.
 iii) Define S-factor. Explain diode reverse recovery characteristics.
 iv) Explain ON-OFF control method.
- Q.2 a) Explain RC triggering circuit with the help of appropriate waveforms. 07
 b) Explain the operation of three-phase fully controlled bridge converter with appropriate waveforms. 08
- Q.3 a) A single-phase voltage controller is employed for controlling the power flow from 230V, 50Hz source into a load circuit considering of $R = 30$ ohm and $WL = 4$ ohm. Calculate 08
 i) Control range of firing angle
 ii) The max value of rms load current
 iii) Max. value of average and rms thyristor current
 iv) Max. possible value of di/dt that may occur in the thyristor.
 b) Draw and explain the V-I characteristics of SCR. Also explain latching and holding current. 07
- Q.4 a) Explain the effect & source inductance on 1- ϕ full converter. 07
 b) What is dual converter? Explain the operation of circulating current mode dual converter. 08
- Q.5 a) With a neat circuit diagram and waveforms. Explain Auxiliary commutation. 07
 b) Explain the effect of source inductance " L_s " on performance of 3- ϕ converter. Derive the equation for voltage drop due to L_s . 08

Section B

- Q.6 Solve any two. 10
 i) Comparison between VSI and CSI.
 ii) Explain the use of feedback diodes in inverter.
 iii) What is power module? Explain.
 iv) HF heating.

- Q.7 a) With the help of neat circuit diagram derive the expression for minimum and maximum load current of class A chopper. 08
 b) Explain various voltage control techniques of an inverter. 07
- Q.8 a) Draw neat diagram and appropriate waveforms of current commutated chopper. Explain the operation. 07
 b) For type – A chopper, source voltage $V_s=220V$ chopping frequency $f=500Hz$, $T_{on} = 800\mu_s$ $R = 1\Omega$, $L = 1mH$ and $E = 72V$. 08
 i) Find whether load current is continuous or not.
 ii) Calculate the values of average O/P voltage and average O/P current.
 iii) Compute the maximum and minimum values of steady state output current.
- Q.9 a) Explain the operation of time delay circuit. 07
 b) Explain 3- ϕ inverter circuit for 180° mode. 08
- Q.10 a) Explain the operation of step down chopper. 07
 b) Explain four quadrant chopper in detail. 08

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-195
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (EC/ECT/IEC/E&C)
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 |
| | <ol style="list-style-type: none"> 1) Discuss the various types & selection criteria in design for inductors. 2) Explain the types & selection criteria for transistors in an electronic circuit design 3) Derive the o/p equation of op-amp based instrumentation amplifier of 3 op-amp configuration. 4) Write a note on: Inverting & non inverting amplifier. | |
| Q.2 | a) Using LM 339 design a Schmitt trigger with following specification
$V_{CC} = 12V, V_{OL} = 0V, V_{OH} = 5V$ $V_{TL} = 1.5V, V_{th} = 2.5V$ | 07 |
| | b) Explain Schmitt trigger with neat circuit diagram & with wave form. | 08 |
| Q.3 | a) Explain features of fixed voltage regulator IC 78XX. | 07 |
| | b) Explain the importance of fuse & filter capacitor in regulated DC power supply. | 08 |
| Q.4 | a) Design a regulated variable Dc power supply using LM337 with given specification
$V_o = -3V \text{ to } -21V$ Load current = -1A | 07 |
| | b) Design a instrumentation amplifier (using three op-amps) with the following specification
gain can be varied over the range $1V/V \leq A \leq 10^3 V/V$ by means of $100k\Omega$ pot. | 08 |

- Q.5 a) Design a temperature measurement system by means of op-amps & thermistor. 07
 b) List the electrical characteristics of photo diodes & photo transistors. 08

Section – B

- Q.6 Solve any two 10
 a) Describe various design considerations to ensure reliability of an electronic product.
 b) Describe heat transfer fundamentals in context with electronics circuit design
 c) Explain the various modes for heat sink design.
 d) Explain PCB design rules for digital circuits.
- Q.7 a) Discuss the various types of signal grounds. 07
 b) A transistor with $V_{CE} = 20V$ & $I_C = 1A$ has a $1^\circ C/W$ junction to a case thermal resistance. If the value of $Q_{CS} = 0.4^\circ c/w$ calculate thermal resistance for heat sink that will keep the maximum temperature at $80^\circ c$ when the ambient temperature is $20^\circ C$. 08
- Q.8 a) Design a ICL 8038 based wave form generator to make the output frequency adjustable to the wide range while keeping value of capacitor C constant & equal to 3600 pf , also calculate the o/p frequency extremes with symmetrical triangular wave. the peak amplitude of the wave is 2.5 V. 07
 b) Design a monostable multivibrator using IC 555 with following specification 08
 $V_{cc} = 5V$ pulse width = 1 msec draw the wave form one below the other at pin no 2,3,& 7
- Q.9 a) Draw & explain the block diagram of ICL 8038. 07
 b) Explain interfacing of relay to digital circuits by drawing a neat circuit diagram. 08
- Q.10 a) Draw & explain the block diagram of moore model for sequential circuit design. 07
 b) Explain interfacing of optocoupler to digital circuits by drawing a neat circuit diagram. 08

Total No. of Printed Pages:02

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

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

N.B Please check whether you have got the right question paper.
 i) Q.No. 1 & Q.No.6 are compulsory.
 ii) Answer any two questions from Q.No.2 to Q.No.5 & Q.No.7 to Q.No.10.

Section A

- Q.1 Attempt any two of the following. 10
 a) Describe the Pin diagram of 8086.
 b) Explain 8086 memory bank Techniques.
 c) Explain minimum & maximum mode of 8086.
- Q.2 a) Draw and explain Architecture of 8086. 07
 b) Explain following Instruction of 8086. 08
 i) ROL
 ii) XCHG
 iii) MUL
 iv) CBW
- Q.3 a) What is interrupt vector table? With the help of neat diagram explain the purpose of it. 08
 b) Explain the Register of 8086. 07
- Q.4 a) Explain interfacing of 8255 with 8086. 07
 b) Explain ADC interfacing with 8086. 08
- Q.5 Write short note on following. (any three) 15
 a) Conditional Jump Instruction
 b) 8086 stack
 c) Status Register of 8086
 d) Interrupt Service Routine

Section B

- Q.6 Attempt any two of the following. 10
 a) Explain features of 80386.
 b) Explain Architecture of 80286.
 c) Explain Addressing mode's of 8051.
- Q.7 a) Explain the salient features of 8051. 07
 b) Draw & Explain 8051 Architecture. 08

- Q.8 a) Explain Pin Diagram of 8051. 08
b) Explain the salient features of Pentium. 07
- Q.9 a) Explain interrupts of 8051. 07
b) Draw a neat diagram to interface a LED with 8051 & write a program to blink it. 08
- Q.10 Write short note on following. (any three) 15
a) RS232
b) PSW of 8051
c) Stack in 8051
d) ID Register

Total No. of Printed Pages: 2

SUBJECT CODE NO:- H-125
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (EC/ECT/E&C)
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 & 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 BEC
- ii. Define joint & conditional Entropy
- iii. Explain Extension of discrete memoryless source

Q.2 a) State and explain channel coding Theorem 07
 b) Apply Huffman coding for following message ensemble & find out coding efficiency 08

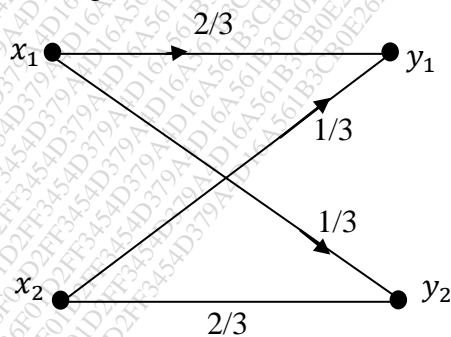
$[x]$	=	$[x_1$	x_2	x_3	x_4	x_5	$x_6]$
$[P(x)]$	=	[0.3	0.2	0.2	0.15	0.10	0.05]

Q.3 a) Apply Shannon fano coding for following messages & find efficiency of code. 07

$[x]$	=	$[x_1$	x_2	x_3	$x_4]$
$[P]$	=	[1/4	1/8	1/2	1/8]

b) Prove that mutual information is always non negative. 08

Q.4 a) A discrete source transmits messages x_1 & x_2 with probabilities $3/4$ & $1/4$. The source connected to the channel given below. Calculate all entropies & mutual information. 07



b) Determine the channel capacity of systematic channel. 08

Q.5 a) Explain LZW Algorithm with example. 07
 b) Explain Run length coding. 08

Section B

- Q.6 Solve any two. (Short Notes) 10
- i) Maximum Prior Estimation
 - ii) Explain Nested codes
 - iii) Explain Time domain approach
- Q.7 a) For a (6,3) LBC, the coefficient matrix [P] is as follows 07
- $$P = \begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \end{bmatrix}_{3 \times 3}$$
- The receiver code words at the receiver are
- i) 001110
 - ii) 111011
- Check whether they are correct or contains errors
- b) Explain syndrome decoding of LBC 08
- Q.8 a) Explain steps for generating systematic cyclic codes & non- systematic cyclic code 07
- b) For systematic cyclic code, find out the generator matrix & parity check matrix given 08
- $$G(D) = D^3 + D + 1$$
- Q.9 a) Explain coding of Turbo coding 07
- b) Explain 08
- i) Tree diagram
 - ii) Trellies diagram
- Q.10 a) What is least square Estimation? Explain in detail 07
- b) Explain performance evolution of AWGN channel 08

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-536
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (ECT/EC/E&C/IE)
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 the remaining Questions in both sections.
- Section – A

- Q.1 Explain any two of following 10
- a) Define PCM? What are the advantages and disadvantages of PCM.
 - b) State and prove various properties of probability.
 - c) Line the difference between discrete and continues random variables.
 - d) Discuss the Noise effect in Delta modulation.
- Q.2 08
- a) Compare PCM, DM, ADM and DPCM.
 - b) A PCM system uses a uniform quantizer followed by V bit encoder. Show that rms signal to quantization noise ratio is $(1.8+6V)$ dB. 07
- Q.3 07
- a) State and prove the Baye's theorem.
 - b) Explain in detail Binomial Distribution probability model. 08
- Q.4 07
- a) What is power spectral Density? Explain properties of PSD.
 - b) A random variable X has the uniform distribution given by 08
- $$F_X(x) = \begin{cases} \frac{1}{2\pi} & \text{For } 0 \leq x \leq 2\pi \\ 0 & \text{otherwise} \end{cases}$$
- Determine m_x , $\overline{X^2}$ and $6x$.
- Q.5 07
- a) Explain probabilities of statistically independent events.
 - b) Explain in detail Ergodic random process in detail. 08

Section – B

- Q.6 Explain any two of following 10
- a) Compare different Line Coding Format.
 - b) Explain Band width requirement of QPSK.
 - c) What are the different application of DSSS.
 - d) Explain PSK system in short.

- Q.7 a) What is matched filter? What are their properties. 08
 b) Represent 1100100111 using following digital data format. 07
 i) Polar NRZ
 ii) Bipolar NRZ
 iii) M-ary system within M=4.
- Q.8 a) Draw and explain Generation and detection of Differential phase shift keying. 08
 b) Derive the expression for the spectrum of BPSK and sketch the same. 07
- Q.9 a) Draw and explain block diagram of DSS transmitter and receiver with waveforms. 08
 b) Explain frequency hopping in detail. 07
- Q.10 a) Explain in detail coherent detection and Non coherent detection methods used in Receiver. 08
 b) Explain Application of FHSS system. 07

Total No. of Printed Pages: 2

SUBJECT CODE NO:- H-543
FACULTY OF SCIENCE AND TECHNOLOGY
T.E.(ECT/EC/E&C/IE)
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 and Q. No. 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 |
| | <ol style="list-style-type: none"> 1. Butterfly structure of DITFFT 2. Applications of DSP 3. Properties of DFT 4. Overlap add method | |
| Q. 2 | <ol style="list-style-type: none"> a) Determine Z-transform of following. <ol style="list-style-type: none"> i. $x(n) = \sin \omega n$ ii. $x(n) = \cos \omega n$ b) Determine inverse z transform using power series method of $X(z) = \frac{z^2+z}{z^3-3z^2+3z-1}$ for $z > 1$ | 08

07 |
| Q. 3 | <ol style="list-style-type: none"> a) Obtain circular convolution of $x_1(n) = \{1, 2, 1, 2\}$ $x_2(n) = \{0, 1, 2, 3\}$ b) Explain overlap –save method for DFT. | 08

07 |
| Q. 4 | <ol style="list-style-type: none"> a) State and prove any four properties of z-transform. b) Compare linear and circular convolution. | 08

07 |
| Q. 5 | Write short notes on any three <ol style="list-style-type: none"> 1. Difference between DFT and DTFT 2. Limitations of DSP 3. Residue method of inverse z transform 4. DIF FFT algorithm. | 15 |

Section B

- Q. 6 Attempt any two 10
1. Magnitude & phase response of digital filters.
 2. Product quantization error
 3. IIR filter design using Approximation of derivatives method
 4. Warping effect
- Q. 7 a) Convert analog filter into digital whose system function is $H(s) = \frac{s+0.2}{(s+0.2)^2+9}$ if $T_s = 1\text{sec}$, use impulse variance method. 08
- b) Explain structure of realization of IIR system. 07
- Q. 8 a) Explain FIR filter design by Hamming window & draw magnitude and phase plot. 07
- b) Design FIR High Pass Filter to meet following specifications, cut off frequency = 250 Hz. Sampling frequency, $f_s=1$ KHz and filter length =7. 08
- Q. 9 a) Explain limit cycle oscillation in recursive system. 07
- b) Explain Gibb's phenomenon in detail. 08
- Q. 10 a) Explain concept of frequency wrapping in IIR filter design. 07
- b) Explain frequency sampling method for design of FIR filter. 08

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-522
FACULTY OF SCIENCE AND TECHNOLOGY
T.E.(ECT/EC/E&C/IE)
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) Find angle between vector $\vec{A} = 4a_x - 2a_y + 3a_z$ and $\vec{B} = a_x + 2a_y + a_z$.
 - (b) Consider the vectors, $A = a_x + a_y$ and $B = a_x + 2a_y + a_z$, determine $|A \times B|$.
 - (c) What is a Curl?
 - (d) State Maxwell's first law.
 - (e) What is electric flux density?
 - (f) Define current and current density.
 - (g) Write expression of potential difference in the field of point charge.
 - (h) What are the boundary conditions for conductor-free space?
- Q.2 (a) Consider the two vectors as: $x = 3a_x + 5a_y + 4a_z$ and $y = -2a_x + 2a_y + 2a_z$ 07
Determine 1) Cross product 2) Dot product 3) Unit vectors 4) magnitude of x and y vector.
- (b) Transfer to Cylindrical Coordinate $F = 10a_x - 8a_y + 6a_z$ at point P(10, -8, 6). 08
- Q.3 (a) Derive the expression for electric field intensity for infinity line charge along the z-axis. 07
(b) Four infinite sheets of charge are located as follows: 08
 20 pC/m^2 at $y=7$, -8 pC/m^2 at $y=3$, 6 pC/m^2 at $y=1$, and 18 pC/m^2 at $Y=-4$. Find E at point (2, 6, -4).
- Q.4 (a) In cylindrical co-ordinates, $J = 10xe^{-100r} a_\phi \text{ A/m}^2$. Find the current crossing the region 07
 $0.01 \leq r \leq 0.02$ and intersection of this region with $\Phi = \text{constant}$ plane.
- (b) If $E = -5xy a_x - 2x^2y a_y + 3a_z \text{ V/m}$, find the work done in carrying a 5 C charge from 08
M(1, 2, 5) to N(2, 8, 6) along the path $y = 3x^2 + z$, $z = x + 4$

- Q.5 (a) What are the boundary conditions for perfect dielectric materials? 07
 (b) Find D (in Cartesian coordinates) at point P(6, 8, -10) caused by point charge of 30 mC at the origin and uniform line $\rho_1 = 50\mu\text{C}/\text{m}$ on z-axis. 04
 (c) State and explain Stoke's theorem. 04

Section – B

- Q.6 Answer the following questions in brief (Any five): 10
 (a) State Biot-Savart law.
 (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 propagation velocity?
 (f) Write expression for Poynting vector.
 (g) What are the applications of Smith chart in transmission line?
 (h) State the expression for characteristics impedance.
- Q.7 (a) A current filament carries a current of 10 A in the a_z direction on the z- axis. Find the magnetic field intensity \vec{H} in Cartesian coordinates at point P (1,2,3) due to this filament if it extends from a) $z=0$ to $z=5$ b) $z=5$ to $z=\text{infinity}$. 07
 (b) State and derive magnetic boundary conditions. 08
- Q.8 (a) Discuss and proof the Poynting theorem and also mention its applications. 07
 (b) Compute the power carried by an electric field. 08
- Q.9 (a) Derive transmission line voltage and current equations. 07
 (b) A 30 m long transmission line with $Z_o = 50 \Omega$ operating at 2 MHz is terminated with a load $Z_L = 60 + j40 \Omega$. If the velocity of wave is $1.8 \times 10^8 \text{m/s}$ on the line. Find (i) reflection coefficient (ii) standing wave ratio and (iii) input impedance. 08
- Q.10 (a) For the steady magnetic field, show that $\nabla \times H = J$. 07
 (b) Given a non-magnetic material having $\epsilon_r = 2.5$ and $\sigma = 10^{-4}$ mho/m. Find numerical values at 4.5 MHz for an attenuation constant. 04
 (c) State and prove Ampere's circuital law and derive Maxwell's equation from it. 04

Total No. of Printed Pages: 02

SUBJECT CODE NO:- H-316
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (EC/ECT/E&C/IEC)
Microprocessors & Peripherals
(Old)

[Time: Three Hours]

[Max. Marks: 80]

Please check whether you have got the right question paper.

N. B 1) Questions 5 & 10 are compulsory. Attempt any two questions from each section from remaining questions.

2) Figures to the right indicate full marks.

Section A

- Q. 1 a) Explain the architecture of 8085 with the help of a neat diagram. 08
 b) Explain the function of the following pins of 8085. 07
 i) ALE ii) RESET iii) READY iv) HOLD
- Q. 2 a) Draw & explain the timing diagram of Memory Read machine cycle. 08
 b) Explain the following instructions: 07
 i) SUI Data ii) DAA iii) RET iv) PUSH Rp
- Q. 3 a) Explain various interrupts of 8085. Also explain RIM & SIM instructions. 08
 b) Write a program to arrange data in descending order. The number of data bytes is stored 07
 at the starting of data array. Array starts from C200H onwards.
- Q. 4 a) What are the different data transfer schemes? Explain in detail. 08
 b) What are the different interrupts of 8085? Which interrupts has highest priority & lowest 07
 priority explain in detail.
- Q. 5 Write short notes (Any two) 10
 i) Addressing modes of 8085.
 ii) Memory organization
 iii) I/O Mapped I/O & Memory Mapped I/O.

Section B

- Q. 6 a) A DAC 08 is to be interfaced with 8085 using 8255. Draw interfacing diagram and 08
 write a program for generation of triangular wave.
 b) With the help of block diagram explain interrupt controller IC 8259 in detail. 07
- Q. 7 a) With the help of neat diagram explain interfacing of LED with 8255. Write a program to 08
 turn ON & OFF LED.
 b) What are the different modes of 8259? Explain them. 07

- Q. 8 a) An 8251 USART is to be interfaced with 8085 using 8255. Explain how data can be transmitted serially over $T \times D$ line. 08
b) Explain the architecture of 8255 in detail. 07
- Q. 9 a) Explain how you can use 8155 timer for the generation of square wave. 08
b) Interface a stepper motor to 8085 using 8255. Interface 8255 in I/O mapped I/O. 07
- Q. 10 Write short notes on:- (Any two) 10
- a) Logic Analyzer
 - b) Digital I E Tester
 - c) Difference between Synchronous & Asynchronous Data Communication.

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-385
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (EC/ECT/IEC/E&C)
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.1 and Q.no.6 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) Explain the concept of virtual ground and virtual short.
 - b) What is Voltage follower? Explain state applications.
 - c) What is Precision Half wave rectifier? Explain
 - d) Explain wein Bridge oscillator using op-amp.
- Q.2 08
- a) Draw and explain the block diagram of op-amp.
 - b) Explain how Noise and frequency compensation is achieved in op-amp. 07
- Q.3 08
- a) Draw and explain following op-amp circuits
 - i) Differential amplifier
 - ii) Low voltage ac and dc voltmeter.
 - b) Explain the operation of V to I converter with grounded Load. 07
- Q.4 08
- a) Draw and explain Antilog Amplifier using op-amp state applications.
 - b) What is Schmitt trigger? Explain operation of Schmitt trigger –state applications. 07
- Q.5 08
- a) Explain the Saw tooth generator circuit.
 - b) Draw and explain function generator using IC 8038. 07

Section – B

- Q.6 Attempt the following (any two) writes short notes. 10
- KRC filters
 - Linear voltage regulator using op-amp
 - IC CD 4046 CMOS PLL
 - Tow – Thomas filter
- Q.7 a) What is Multiple feedback filters state applications. 08
- b) Design a high pass filter at a cut off frequency of 1 KHZ with pass band gain of 2? 07
- Q.8 a) Draw and explain operator of PLL as frequency multiplier state applications. 08
- b) What is Analog and digital phase detector? Explain. 07
- Q.9 a) Draw and explain functional block diagram of IC 723 regulator. 08
- b) Explain the operation of step down switching regulator using IC 78540. 07
- Q.10 a) What is VCO? Explain state applications. 08
- b) Explain following terms of PLL 07
- Capture Range
 - Lock Range
 - Free Running frequency

Total No. of Printed Pages 02

SUBJECT CODE NO:- H-351
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (ECT/E&C)
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) What is the Bandwidth requirement of a digital modulation system?
 - b) What is rectangular sampling? Explain.
 - c) What are the types of uniform quantizer? Describe with waveform.
 - d) Describe reconstruction filter.
- Q.2 08
- a) State sampling theorem. Derive the expression for sampling theorem with necessary waveforms.
 - b) Explain process of quantization. Explain the pulse code modulation technique in brief with the necessary waveforms. 07
- Q.3 08
- a) Compare analog and digital communication system.
 - b) The signal $g(t) = 10 \cos(40\pi t) \cos(400\pi t)$ is sampled at the rate of 500 samples / sec 07
 - i) Determine the Nyquist rate
 - ii) Calculate the cut off frequency of ideal reconstruction filter.
 - iii) If $g(t)$ is considered to be a band pass signal, determine the lowest possible sampling rate.
- Q.4 08
- a) Draw and explain PCM transmitter and receiver.
 - b) Explain the concept of companding technique. What is $\mu - law$ companding? 07
- Q.5 Write notes on 15
- a) Review of random variables and stochastic processes.
 - b) Aliasing and effect of under sampling
 - c) PWM

Section B

- Q.6 Attempt any two from the following 10
- a) Explain the various techniques to detect baseband digital signal.
 - b) Explain matched filter
 - c) State advantages and disadvantages of BPSK
 - d) Define PN sequence

- Q.7 a) Derive an expression for error probability of an – optimum filter. 08
 b) Explain delta modulation with suitable diagram. Also compare performance of Delta modulation with adaptive delta modulation. 07
- Q.8 a) Draw the block diagram of QPSK transmitter and receiver and explain the working. 08
 b) Explain ASK in detail. State applications. 07
- Q.9 a) Explain direct sequence spread spectrum in detail. 08
 b) Compare slow and fast frequency hopping. 07
- Q.10 Write notes on 15
 a) Model of spread spectrum communication system.
 b) Gaussian Noise and its PDF
 c) Inter symbol interference [ISI]

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-295
FACULTY OF SCIENCE & TECHNOLOGY
T.E. (EC/ECT/IEC/E&C)
Electromagnetic Engineering
(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 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) A point 'P' is represented as P(4,3,1) in Cartesian coordinate system. Represent this point in equivalent cylindrical coordinate system.
 - b) Write table of dot product of unit vectors in Cylindrical and rectangular coordinate system.
 - c) Define a mathematical expression of Gauss Law.
 - 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) What are the boundary conditions for perfect dielectric materials?
 - h) What is a potential gradient?
- Q.2 a) Derive the expression for electric field intensity for infinity line charge along the z-axis. 07
- b) If a line charge $\rho_1 = 50nc/m$, is located along a line $x = 2m, y=5m$ in free space, find an 08 electric field intensity (\vec{E}) at point p(1,3,-4).
- Q.3 a) Consider the two vectors as $\vec{x} = 3\vec{a}_x + 5\vec{a}_y + 4\vec{a}_z$ and $\vec{y} = -2\vec{a}_x + 2\vec{a}_y + 2\vec{a}_z$ 07
Determine i) Cross product ii) Dot product iii) Unit vectors iv) magnitude of x and y vector.
- b) Four infinite sheets of charge are located as follows: 08
 $20pc/m^2$ at $y = 7, -8 pc/m^2$ at $y = 3, 6pc/m^2$ at $y = 1,$ and $18pc/m^2$ at $Y = -4$. Find \vec{E} at point (2,6,-4).
- Q.4 a) Explain the concept of continuity of current and derive its necessary expression. 07
- b) Two uniform line charge $8nc/m$ each located at $x=1, z=2$ and at $x= -1, y=2$ in free space. 08
If the potential at the origin is 100V. Find V at P (4,1,3).

- Q.5 a) In cylindrical co-ordinates, $\vec{J} = 10xe^{-100r} a_\phi$ A/m². Find the current crossing the region $0.01 \leq r \leq 0.02$ and intersection of this region with $\Phi = \text{constant}$ plane. 07
- b) A point charge $Q = 10$ nC is at origin in free space. Find electric flux density at P (1,0,1). 08

Section – B

- Q.6 Answer the following questions in brief (any five): 10
- State Biot- Savart Law.
 - What are properties of good conductor?
 - Write Maxwell's equation in integral form.
 - What are boundary conditions for static magnetic field?
 - What is Skin effect?
 - Define Stoke's theorem.
 - What is meant by 'mutual inductance'?
 - What is Amper's Circuital Law?
- 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 i) $z = 0$ to $z = 6$ ii) $z = 6$ to $z = \text{infinity}$ 07
- b) Given point A (1,2,4), B (-2,1,3) and C (3,1,-2). Let a differential element with $I = 6$ A and $dl = 10^{-4}$ m be located at A. The direction of dl is from A to B. find $d\vec{H}$ at C. 08
- Q.8 a) What is force and torque on closed circuit? 07
- b) Given the magnetic field $\vec{H} = 6r \sin\phi a_r + 18r \sin\theta \cos\phi a_\phi$. Evaluate 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 $+\vec{a}_\theta$. 08
- Q.9 a) Region – 1 is the semi – infinite space in which $2x - 5y > 0$, which region – 2 is defined by $2x - 5y < 0$. Let $\mu r_1 = 3, \mu r_2 = 4$, and $H_1 = 30a_z$ A/m. Find i) $|B_1|$ ii) $|BN_1|$ iii) $|Ht_1|$ iv) $|H_2|$ 07
- b) Explain Faraday's law. 08
- Q.10 a) A 9375 MHz uniform plane wave is propagating with $\epsilon_r = 2.26$ 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 Impedence v) Propagation constant. 07
- b) Given a non- magnetic material having $\epsilon_r = 2.25$ and $\sigma = 10^{-4}$ mho/m. Find numerical values at 2.5MHz for i) loss tangent and ii) attenuation constant 08

Total No. of Printed Pages:3

SUBJECT CODE NO:- H-267
FACULTY OF SCIENCE & TECHNOLOGY
T.E. (EC/ECT/IEC/E&C)
Feedback 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 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 indicate full marks.
- v. Assume suitable data if necessary.

SECTION – A

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

- (a) What is feed-forward control system?
- (b) What is meant by disturbance in control systems?
- (c) What is a block diagram reduction rule for shifting take-off point before a block?
- (d) What is Mason's gain formula?
- (e) State transfer function of a DC servo motor.
- (f) How you define 'Type' of system?
- (g) What is the effect of proportional control action on the performance of a system?
- (h) What is a time constant if first order system has transfer function,

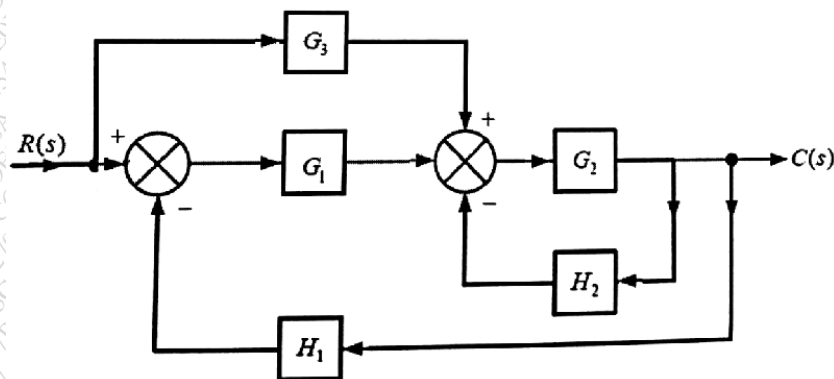
$$G(s) = \frac{5}{s + 4}$$

Q.2 (a) What are the elements of an open loop control system? Give a suitable example. What are the advantages and disadvantages of such open loop control systems? 07

(b) Derive the expression for under-damped response of the second order system subjected to unit step input, i.e. 08

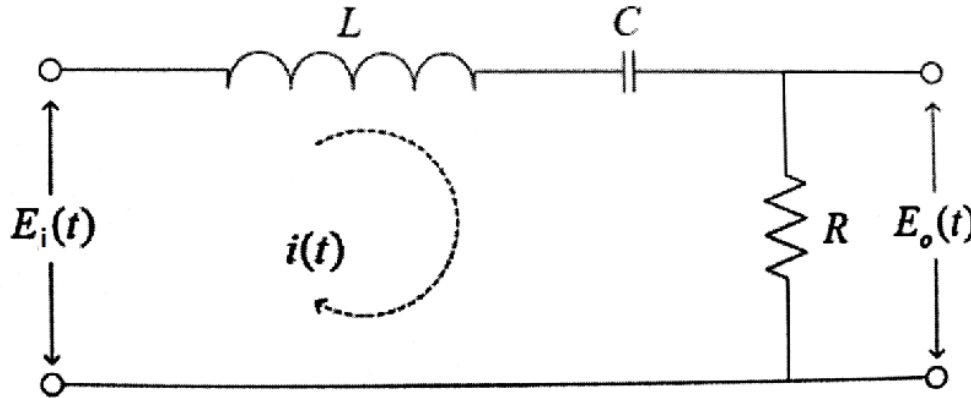
$$c(t) = 1 - \frac{e^{-\zeta\omega_n t}}{\sqrt{1 - \zeta^2}} \sin(\omega_d t + \theta), \text{ where } \omega_d = \omega_n \sqrt{1 - \zeta^2} \text{ and } \theta = \cos^{-1} \zeta$$

Q.3 (a) Reduce the block diagram to its simple form and hence obtain $C(s)/R(s)$ 07



- (b) What is position, velocity and acceleration error constant? For a system $G(s)H(s) = \frac{K}{s^2(s+2)(s+3)}$, find the value of K to limit steady state error to 20 when input to system is $1 + 10t + \frac{40}{2}t^2$. 08

- Q.4 (a) Define- Transfer Function. Find out the transfer function of given network. 07



- (b) Explain Synchro transmitter and receiver with a neat diagram. Also, state its applications. 08

- Q.5 Write short notes on – 15

- (a) Mathematical modeling of physical systems.
- (b) Regenerative feedback
- (c) Proportional-Integral-Derivative (PID) control action

SECTION – B

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

- (a) What is effect of adding poles in root locus?
- (b) What is meant by relative stability?
- (c) What is a principle of argument in Nyquist stability?
- (d) How stability is defined based on information of gain and phase margin?
- (e) State any two correlations between time domain and frequency domain
- (f) What do you mean by ‘Fuzzy’ term?
- (g) What is meant by observability?
- (h) State any four manufacturers of PLC.

- Q.7 (a) An open loop transfer function of unity feedback system is, 07

$$G(s) = \frac{K}{s(s^2 + s + 1)(s + 2)}$$

Find the range of K for stability. For what value of K system will oscillate and what is frequency of oscillations?

- (b) Consider, 08

$$G(s)H(s) = \frac{10}{s(s+1)(s+2)}$$

Sketch the rough nature of polar plot of a given system. Calculate its gain margin in dB. Hence comment on its stability.

- Q.8 (a) Evaluate controllability and observability of the system represented in state space model with, 07

$$A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 0 & -2 & -3 \end{bmatrix} \text{ and } B = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} \text{ and } C = [3 \ 4 \ 1]$$

- (b) Sketch the root locus diagram for a system having, 08

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

- Q.9 A unity feedback control system has, 15

$$G(s) = \frac{80}{s(s + 2)(s + 20)}$$

Draw a Bode plot. Determine ω_{gc} , ω_{pc} , G. M., P. M. Comment on stability.

- Q.10 Write short notes on – 15

- (a) Neural Network based control system
- (b) Solution of state equation
- (c) Special cases in R-H Stability criteria.

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-550
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (ECT/EC/E&C/IE)
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) Question No. 1 and 6 are compulsory.
 - (ii) Answer any two questions form remaining question each from section A and B.
 - (iii) Figures in right column indicate full marks.

SECTION – A

- | | | |
|-----|--|----------|
| Q.1 | Answer the following in brief (Any Five) | 10 |
| | <ol style="list-style-type: none"> a) What is object oriented programming? b) “Java does not support operator loading”. Justify the statement. c) What is difference between & operator and && operator? d) What do you mean by static class in Java classes? e) What is difference between an interface and abstract class? f) What are the advantages of exception handling? g) What is the purpose of using Java Finally block? h) What is throw in exception handling? | |
| Q.2 | <ol style="list-style-type: none"> a) Discuss on advantages and disadvantages of Object Oriented Programming. b) Write a java program to find the area and perimeter of square and circle using interface. | 07
08 |
| Q.3 | <ol style="list-style-type: none"> a) Differentiate between init () and start () methods with examples. b) Give example of Java exception handling where we can use try – catch statement. | 07
08 |
| Q.4 | <ol style="list-style-type: none"> a) Explain hierarchy of Java exception classes with neat diagram. b) Write short note of the following Object Oriented concepts: (i) Encapsulation (ii) Dynamic binding. | 07
08 |
| Q.5 | Write short note on: <ol style="list-style-type: none"> a) Control structure in Java b) Inner classes c) Overriding method of exception handling. | 15 |

SECTION – B

- Q.6 Answer the following in brief (any five): 10
- What are types of streams that can be created in java?
 - What is meant by “Object Deserialization”?
 - What is synchronization in Java threads?
 - Define: Thread life cycle.
 - What is meant by multi-threading?
 - What is the role of layout manager in AWT?
 - What is source and listener in Java event handling?
 - List the features of swing.
- Q.7 a) Explain the useful methods of input streams. 07
 b) Write a Java program for creating four threads to perform the following operations: 08
- Getting N numbers as input
 - Printing the even numbers
 - Printing the odd numbers
 - Computing the average.
- Q.8 a) Explain various thread states and properties in detail. 07
 b) Describe the different stages in the life cycle of an Applet. 08
- Q.9 a) What are the ways in which we can pass parameters to the applet? 07
 b) Explain the Java File Output stream using a programming example. 08
- Q.10 Write short notes on: 15
- Object serialization
 - Advantages of Multithreading
 - ParseInt () method.

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-551
FACULTY OF SCIENCE AND TECHNOLOGY
T.E.(ECT/EC/E&C/IE)
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
- 1) Question No. 1 and 6 are compulsory.
 - 2) Answer any two questions from remaining questions each from Section A and B.
 - 3) Assume suitable data, if necessary.

Section A

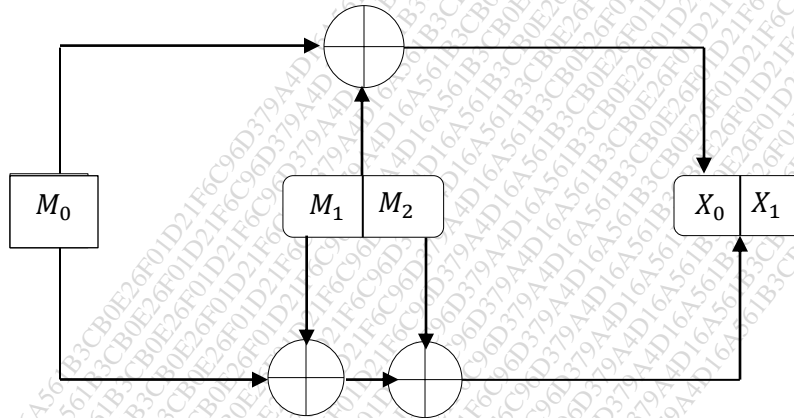
- Q.1 Answer the following in brief (any five) 10
- a) What is meant by self-information and mutual information?
 - b) State channel coding theorem.
 - c) What is meant by block coding?
 - d) Let, $\alpha = (011101)$ and $\beta = (101011)$. Determine the Hamming distance, $d(\alpha, \beta)$.
 - e) What is meant by systematic and non-systematic hamming codes?
 - f) What is burst error?
 - g) What are the applications of five codes?
 - h) Define cyclic code.
- Q.2 a) Consider a DMS with source probabilities $\{0.35, 0.25, 0.20, 0.15, 0.05\}$. 07
- 1) Determine the Huffman code for this source.
 - 2) Determine the average length \bar{R} of the code words.
 - 3) What is the efficiency η of the code?
- b) Define linear block code. Write a vector code table and weight for a (6,3) linear block code. Also define the linearity properly for any two vector. 08
- Q.3 a) Design a single error correcting code with a message block size of 11 and show that by 07
 an example that it can correct single error.
- b) Explain briefly about Golay codes and fire codes. 08
- Q.4 a) Generate a CRC code for data word of 110010101, if the divisor is 10101. Also, give 07
 the steps of CRC checking.
- b) Give the statement of information capacity theorem and explain the same in detail. 08
- Q.5 Write short notes on- 15
- a) Shannon-Fano coding
 - b) Hamming codes.
 - c) Generation of cyclic codes.

Section B

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

- a) What is the full form of BCH code and RS code?
- b) State typical example of binary BCH code.
- c) What is meant by 'block length' and 'minimum distance' in BCH code?
- d) What is the difference between block code and convolution code?
- e) State any two properties of a convolution code.
- f) What is meant by 'Distance Bound' in convolution code?
- g) Why do we need to compress speech signals?
- h) State the basic principle of channel vocoder.

Q.7 a) Draw the state and trellis diagram for given encoder in figure – 1 07



b) Write short note on: RS code 08

Q.8 a) Explain Turbo coding and decoding with example. 07

b) What are the different masking techniques in audio signals? Explain anyone in detail. 08

Q.9 a) Explain LZW algorithm. 07

b) Explain about nested codes with examples. 08

Q.10 Write short notes on:- 15

- a) BCH code
- b) Viterbi coding
- c) Adaptive Huffman coding.

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-552
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (ECT/EC/E&C/IE)
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) Question no. 1 and 6 are compulsory.
 - 2) Answer any two questions from remaining questions each from Section A and B.

Section A

- Q.1 Answer the following in brief. (any five) 10
- a) State applications of parallel processing.
 - b) What is the necessity of high performance in processing system?
 - c) State examples of uniprocessor systems' drawbacks.
 - d) What is meant by "Job sequencing"?
 - e) What is out of order execution?
 - f) State example of reservation table.
 - g) What are the features of Dual core processor?
 - h) What is EPIC?
- Q.2
- a) Distinguish between Instruction level and Thread level parallelism with examples. 07
 - b) Give the classification of pipelining processors. Explain each in brief. 08
- Q.3
- a) Explain the data buffering techniques with a suitable diagram/example. 07
 - b) Explain about VLIW processor in detail. 08
- Q.4
- a) Describe the architecture of Pentium computer with neat diagram. 07
 - b) Explain about speed up performance laws. 08
- Q.5
- a) Write short note on- Future trends in processing. 07
 - b) Write short note on- Software pipelining. 08

Section B

- Q.6 Answer the following in brief (any five) 10
- a) What is meant by 'spooling'? State an example.
 - b) State the types of an Operating Systems based on processing.
 - c) What is bootstrap loader?
 - d) What is meant by 'Context Switching'?
 - e) What is Critical Section?
 - f) What is the significance of multithreading in processing?
 - g) What are the advantages and disadvantages of segmentation?
 - h) What is swapping?

- Q.7 a) What is meant by I/O manager in OS? Explain in detail. 07
b) Discuss the role of a process in the process management. 08
- Q.8 a) Explain the First-come, First-served type (FCFS) scheduling algorithm with example. 07
b) Explain the concept of Paging with the help of neat diagram and example. 08
- Q.9 a) Explain following in brief about VM: i) Definition ii) Need and iii) mapper. 07
b) Explain the operating system services with a neat diagram. 08
- Q.10 a) Explain about multitasking and multiprogramming structure of OS in detail. 07
b) What is semaphore? What are its types? Explain any one in detail. 08

Total No. of Printed Pages:02

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

[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 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) List the internal registers in 8085 microprocessor and their abbreviations.
 - b) Why the lower order address bus is multiplexed with data bus in 8085 microprocessor?
 - c) Illustrate the example using CALL instruction.
 - d) What are the vectored interrupts?
 - e) State suitable example each of the 1 byte and 2 byte instructions of 8085.
 - f) What is use of 8251 USART?
 - g) What is meant by 'peripheral mapped I/O'?
 - h) What are the different modes of 8255?
- Q.2 07
- a) Explain different control signals of 8085 microprocessor.
 - b) Explain the following instructions with suitable example of each (any four) 08
 - 1) LXI 2) MOV 3) SHLD 4) LDAX 5) CMP 6) STA
- Q.3 07
- a) Write an 8085 assembly language program (ALP) to generate a software delay of 100 ms.
 - b) Explain architecture and working of 8253 programmable interval timer in detail. 08
- Q.4 07
- a) Draw a neat pin diagram of 8085 microprocessor. Explain their functions.
 - b) Design a microprocessor system to interface an $8K \times 8$ EPROM and $8K \times 8$ RAM. 08
- Q.5 07
- a) Draw and explain the timing diagram of memory WRITE cycle with example.
 - b) Interface multiplexed 4-digit seven segment display with 8085 microprocessor and write a program to display BCD number 5432 on it. 08

Section B

- Q.6 Answer the following questions in brief. (Any five) 10
- Explain PSW of 8051.
 - What are the two types of external hardware interrupts in 8051?
 - What is the role of TXD and ALE pin in 8051?
 - Explain MULAB instruction.
 - What is indexing in the 8051?
 - What are the addressing modes in 8051?
 - What is TMOD register?
 - What are the common baud rates used for serial communication?
- Q.7 a) What are code memory and external data memory related instructions of 8051? Explain in detail. 07
- b) Explain the following instructions in 8051: 08
- MOV @ Ri, # data
 - ANL e, bit
 - MOV C, A @ A + PC
 - MOVXA, @DPTR
- Q.8 a) Explain the architecture of 8051 with the help of a neat diagram. 07
- b) With the help of a neat diagram, explain interfacing of ADC with 8051 microcontroller. 08
- Q.9 a) Write an 8051 assembly language program (ALP) to multiply 25H by 10H using the technique of repeated addition. 07
- b) With the help of a neat diagram, explain interfacing of LED with 8051 microcontroller. Write a program to blink it. 08
- Q.10 a) Explain the function of SBUF and SCON registers in 8051 in detail. 07
- b) Explain interrupt structure of 8051 microcontroller in detail. 08

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-420
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (EC/ECT/IEC/E&C)
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 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) State the limitations of DSP.
 - b) State about energy signal and power signal.
 - c) State any two properties of ROC.
 - d) What is Z-transform of the signal $x(n) = \cos(\omega_0 n) u(n)$.
 - e) With reference to Z-transform, state the initial and final value theorems?
 - f) What do you mean by 'DFT as a linear transformation'?
 - g) What is an overlap-save method?
 - h) State time shifting property of DFT.
- Q.2 a) A discrete-time system is described by the following rule: 07
 $y(n) = 0.5 x(2n) + 0.5 x(2n - 1)$; Where x is the input signal, and y the output signal.
 Classify the system as:
- i. Causal /non – causal
 - ii. Linear / nonlinear
 - iii. Time – invariant / time – varying
- b) Derive relation between Fourier transform and Z- transform. 08
- Q.3 a) Determine the z-transform and corresponding region of convergence of the following signals: 07
- i. $x(n) = u(n - 1)$,
 - ii. $x(n) = (-0.8)^n u(n)$, and
 - iii. $x(n) = (-0.8)^n [u(n) - u(n - 1)]$, where, $u(n)$ is the unit step signal.
- b) What are the two types of FFT algorithms? Explain any one with the help of butterfly structure and mathematical equations involved in it. 08

- Q.4 a) Find the inverse Z-transform of $(z) = \frac{2z^2+2z}{z^2+2z-3}$. 07
- b) Find the DFT of a sequence $x(n) = \{1, 2, 3, 4, 4, 3, 2, 1\}$ using DFT algorithm. 08
- Q.5 a) Define convolution. Define commutative and associative law of convolutions. Compare Linear and Circular Convolution. 07
- b) Write short note on – Computation of inverse DFT using FFT. 08

Section B

- Q.6 Answer the following questions in brief (any five): 10
- What are the filter parameters required to design a digital Butterworth filter?
 - What are the two types of Chebyshev filters?
 - State typical mapping used (s-plane to z-plane) in Impulse Invariant Transformation.
 - State Gibb's phenomenon.
 - What is a linear phase FIR filter?
 - Write a mathematical expression for Blackmann window.
 - What is meant by quantization of input data?
 - Give an example of limit cycle in digital filter.

- Q.7 a) Explain the concept of quantization by truncation and rounding with typical examples. 07
- b) Design a low – pass IIR digital filter $H(z)$ with maximally flat magnitude characteristics. 08
The pass- band edge frequency ω_p is 0.25π with a pass- band ripple not exceeding 0.5dB. The minimum stop-band attenuation at the stop-band edge frequency ω_s of 0.55π is 15dB. Assume the necessary data, if required.

- Q.8 a) What are the different structures used for realization of IIR systems? Explain any one in detail. 07
- b) A low pass filter is to be designed with the desired frequency response: 08

$$H_d(w) = \begin{cases} e^{-j2w}, & -0.25\pi \leq w \leq 0.25\pi \\ 0, & 0.25\pi \leq w \leq \pi \end{cases}$$
 Obtain the filter coefficients, $h(n)$ using the Hamming window.

- Q.9 a) Write a short note on – Elliptic filters. 07
- b) Explain frequency sampling method to design a FIR filter. 08

- Q.10 a) Explain the concept of quantization of filter coefficients in detail. 07
- b) Draw the direct form structure of the FIR systems described by the following transfer function: 08

$$H(z) = 1 + \frac{1}{2}z^{-1} + \frac{3}{4}z^{-2} + \frac{1}{4}z^{-3} + \frac{1}{2}z^{-4} + \frac{1}{5}z^{-5}$$

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-579
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (ECT/EC/E&C/IE)
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 section A and B each.
- Section A

- Q.1 Explain any five of following. 10
- a) What is DIAC? Draw it's structure and symbol.
 - b) Define Latching and holding current of SCR.
 - c) Define reverse recovery time and reverse recovery current of power diodes.
 - d) What do you mean by two quadrant converter? Where it is used.
 - e) List out power factor improvement techniques of converter.
 - f) What is step-down cycloconverter?
 - g) Define integral cycle control?
- Q.2
- a) Explain with the help of neat diagram, structure and V-I characteristics of IGBT 07
 - b) A relaxation oscillator using an UJT is designed for triggering on SCR. The UJT has 08
 following data:
 $\eta = 0.63$, $I_p = 0.7mA$, $V_v = 1.2V$, $I_v = 7mA$, $V_p = 16V$, $R_{BB} = 5.5K\Omega$, $C = 0.1\mu F$,
 Normal leakage current with emitter open =4mA, firing frequency =2KHZ. Compute
 values of charging resistor and external resistor connected in the base circuit.
- Q.3
- a) What is Dual converter? Explain the operating principle of $1 - \phi$ dual converter in 07
 circulating current mode.
 - b) An SCR is used to control the power of 1 KW, 230V, 50HZ heater. Determine the heater 08
 power for firing angles of 45° and 90° .
- Q.4
- a) Explain phase angle control method of A.C. voltage controller with neat circuit diagram 07
 and waveform.
 - b) A single phase full wave A.C. voltage controller feeds a load of 10Ω with an input voltage 08
 of 230V, 50Hz, firing angle for both SCRS is 45° , calculate
 i. RMS value of o/p voltage
 ii. Load power and input P.F.
 iii. Average and rms current of SCRS.
- Q.5
- a) Explain the significance of load and source inductance on the performance of single phase 07
 converter.
 - b) Explain class-B commutation techniques used for SCR with circuit diagram and 08
 waveforms.

Section B

- Q.6 Explain any five of following. 10
- Define line commutated inverters.
 - List out limitation of series inverters
 - What is mean by current source inverter (CSI)?
 - What is meant by class 'D' chopper?
 - What is two quadrant chopper?
 - Define ring counter.
 - List out various applications of HF heating
- Q.7 a) Draw the circuit diagram and explain the operation of single phase bridge inverter feeding an inductive load with waveforms. 08
- b) Calculate the o/p frequency and attenuation factor of series inverter circuit with the following parameters. 07
- $$L = 10mH, C = 0.1\mu f, R = 500\Omega, T_{off} = 250 \mu sec, tq = 25\mu sec.$$
- Q.8 a) Explain current –commutated chopper along with various waveforms. 07
- b) For class A chopper, if 08
- $$V_s = 200V, L = 1mH, R = 0.3\Omega, E = 20V, T = 2300\mu sec \text{ and } t_{on} = 1000\mu sec$$
- find average current, I_{max} and I_{min} values of an instantaneous current, value of t_{on} for which current is continuous.
- Q.9 a) Explain the speed control method of D.C. motor using MOSFET based chopper. 08
- b) Explain servo controlled voltage stabilizer 07
- Q.10 a) Compare series and parallel inverter. 07
- b) Explain in detail CLC and TRC techniques in chopper. 08

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-603
FACULTY OF SCIENCE & TECHNOLOGY
T.E. (ECT/EC/E&C/IE)
Elective-II: Speech Processing
(Revised)

[Time: Three Hours]

[Max.Marks: 80]

N.B Please check whether you have got the right question paper.

- 1) Q. No. 1 & Q. No. 6 are compulsory.
 2) Solve any two questions from remaining from each section.
 3) Assume suitable data whenever necessary.
 4) Figure to right indicate full marks.

SECTION – A

- Q.1 1) Solve any five questions from the following 10
- What is threshold of hearing?
 - What is the differentiate between speech & silence.
 - What is the differentiate between voiced & unvoiced speech?
 - Define a speech signal.
 - What is shunt time Fourier Transform [STFT]?
 - State any four application of speech processing?
 - Define articulators.
- Q.2 a) Explain in detail classification of English phonemes. 07
 b) Write a detailed note on place & manner of articulation. 08
- Q.3 a) Explain pitch period estimation using short time autocorrelation in detail. 07
 b) With the related equations, block diagram explain short time average zero crossing rate in detail. 08
- Q.4 a) Explain linear filtering interpretation of short time spectrum analysis with suitable block diagram. 07
 b) A speech signal is sampled at 20 K samples per second. A 20msec window is used for short term spectral analysis. The window is shifted by 10m sec in consecutive analysis frame. Assume that a radix 2 FFT is used. 08
- How many samples of speech are available in each segment.
 - What is the frame rate?
 - What is the DFT & FFT size to guarantee that there is no time aliasing.
 - What is the Frequency resolution?
- Q.5 Write short note on any three 15
- Spectrographic displays
 - Median smoothing
 - Discrete time model for speech production
 - The human hearing mechanism.

SECTION – B

- Q.6 Attempt any five 10
- a) Define cepstral domain.
 - b) What are the problems with speech recognition system.
 - c) What is multi pulse excitation.
 - d) Define the term “quefrency”.
 - e) Explain the term “liftering”.
 - f) Define pitch detection.
 - g) What are vocoders
- Q.7 08
- a) With a neat block diagram, explain perceptual linear prediction.
 - b) What is MFCC? Explain the method to calculate MFCC using block diagram. 07
- Q.8 08
- a) Draw a block schematic for a channel encoder & decoder & explain its operation.
 - b) Draw & explain block diagram of CELP. 07
- Q.9 07
- a) Explain the application for speech recognition in detail.
 - b) Draw the block schematic for TTS synthesis system & explain the functions of each block. 08
- Q.10 Write short note on any three. 15
- a) Speech recognition system
 - b) Applications of MFCC
 - c) Single stage lattice structure
 - d) HMM.

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-566
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (CSE/IT)
Advanced Java
(Revised)

[Time: Three Hours]

[Max. Marks: 80]

Please check whether you have got the right question paper.

- N.B
- 1) Q. No. 01 and Q. No. 06 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 questions:-	10
	<ol style="list-style-type: none"> i) Define AJAX. ii) Define JSP Directives. iii) What is servlet config. iv) Enlist the technologies of J2EE. v) What is cookies? vi) Differentiate Page Vs. Request Scope in JSP. vii) Explain JSP scripting, Expression, comment tag. viii) Define servlet. 	
Q.2	<ol style="list-style-type: none"> a. Explain the JSP life cycle in detail. b. Explain J2EE application architecture in detail. 	07 08
Q.3	<ol style="list-style-type: none"> a) Explain in detail servlet life cycle. b) What is RMI? Explain the architecture of RMI in detail. 	07 08
Q.4	<ol style="list-style-type: none"> a) Write a program to demonstrate any two JSP Action tags. b) Explain session tracking in detail. 	08 07
Q.5	Write a note on (any three)	15
	<ol style="list-style-type: none"> a) Custom tag in JSP b) Deployment descriptor c) JSP Implicit objects d) JSON 	

Section B

- Q.6 Attempt any five questions. 10
- 1) What is entity bean?
 - 2) What is MVC?
 - 3) Define web service? Enlist its types.
 - 4) What are advantages of Hibernate?
 - 5) What is the use of UDDI?
 - 6) What is WSDL?
 - 7) What is O/R mapping?
 - 8) Enlist spring frameworks modules.
- Q.7 a) Explain spring architecture in detail. 07
 b) Create a database table. Write Java beam and hibernate mapping file to show mapping between database table and Java bean. 08
- Q.8 a) Differentiate between stateful and stateless session beams. 07
 b) Explain the architecture of Hibernate in detail. 08
- Q.9 a) Explain the following: UDDI, WSDL, XML 07
 b) Explain the architecture of FTB. 08
- Q.10 Write a note on (any three) 15
- a) Dependency Injection
 - b) Components of JMS
 - c) JAX-RS 2.0
 - d) HQL