Total No. of Printed Pages:2

SUBJECT CODE NO:- P-5

FACULTY OF ENGINEERING AND TECHNOLOGY

T.E.(EC/ECT/IEC/E&C) Examination May/June 2017

Electromagnetic Engineering

(Revised)

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

"Please check whether you have got the right question paper".

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

Section A

Q.1 Solve any 2 10

a) Derive the expression of capacitance of coaxial capacitor
b) State & explain Divergence Theorem.
c) Derive an expression of energy density in an electrostatic field
d) Derive the expression of work done in moving a point charge in an electric field.

Q.2 a) If a line charge ρ_1=50nC/m is located along the line X=2m, y=5m in free space, Find $\bar{E}$ at P(1,3,-4) 07

b) If the surface X=4 m contains a uniform surface charge density ρ_s=18nC/m^2 at what point in the Z=0 plane is E_{total}=0 08

Q.3 a) Given 60 μC point charge located at the origin. Find the total electric flux passing through that portion of the sphere r=26 cm bounded by $0 < \theta < \pi/2$ and $0 < \phi < \pi/2$ 07

b) Four infinite uniform 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 -18 pC/m^2 at y=--4. Find $\bar{E}$ at point (2,6,--4)

Q.4 a) Explain in detail continuity of current. 07

b) Four identical point charges of 4nC each are located at the corners of a square, 0.5mm on a side in free space. How much work must be done to move one charge to a point equidistant from the other three and in the same plane 08

Q.5 a) The polarization within a region having ε_R=2.7 has the uniform value 08
$\bar{p}$ =--0.2 a_x +0.7 a_y+0.3 a_z μC/m^2 Find a) $\bar{E}$ b) $\bar{D}$

b) Given the potential field in cylindrical coordinates V= $\frac{100}{Z^2+1}\rho \cos\phi$Volts and 07
point p at $\rho = 3m,\ \phi = 60^0$, Z=2 m find a) V b) $\bar{E}$ at point P

Section B

Q.6 Solve any 2 10

a) Derive Amperes circuital law in point form
b) Derive the equation of total power in a uniform plane wave by poynting theorem.
c) Explain standing wave ratio
d) Derive boundary conditions for static magnetic field

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Q.7 **a)** Find $\bar{H}$ in at **P(2,3,5)** in Cartesian coordinates if there is an infinitely long current filament passing through the origin and point **C**. The current of **60A** is directed from the origin to **C** where the location of **C** is **C(0,0,1)** 07

b) A current filament carries a current of 10A in the $\mathbf{a}_z$ direction on the z axis. Find the magnetic field intensity $\bar{H}$ in Cartesian coordinates at a point p(1,2,3) due to this filament if it extens from i) Z = 0 to 5 m ii) Z=5 to infinity 08

Q.8 a) Find the amplitude of the displacement current density i) in the air near a car antenna where the field strength of an FM signal is $\bar{E}$=**100 cos (6.277*10^8 t--2.092 y)$\mathbf{a}_y$** V/m 07

ii) in an air space within a large transformer where

$\bar{H}$ =**10^6 cos (377 t+1.2566*10^{-6} z) $\mathbf{a}_y$** A/m

b) Given $\bar{H}$ =300 cos (3*10^8 t --y)$\mathbf{a}_z$ A/m in free space find the emf developed in the $\boldsymbol{\alpha_\phi}$ direction about the closed path having corners at (0,0,0,),(1,0,0) ,(1,1,0) and (0,1,0) 08

Q.9 a) A 9375 MHz uniform plane wave is propagating in polystyrene ε_R=2.56. If the amplitude of electric field intensity is 20V/m and the material is assumed to be lossless find i)phase constant ii)Wavelength iii) velocity of propagation iv) intrinsic impedance v) propagation constant 07

b) Given a non-magnetic material having ε_R=2.25 and σ=10^{-4} mho/m find numerical values at 2.5 MHz for

i) loss tangent ii) attenuation constant 08

Q.10 a) In a material for Which ε_R=1,σ=5 mho/m the electric field intensity is $\bar{E}$=250 sin(10^{10} t) v/m. Find the conduction current density and displacement current density for given field. Also find the frequency at which they have equal amplitudes. 07

b) Assume μ_1 =4μH/m in region 1 where z>0 while μ_2=7 μH/m in region 2 where z<0. $\bar{K}$ =80 $\boldsymbol{a_x}$ A/m on the surface z=0. We establish a field 08

$\bar{B}_1$=2$\mathbf{a}_x$ --3 $\mathbf{a}_y$**+6**$\mathbf{a}_z$ mT in region 1. Find the value of $\bar{B}_2$

2017

Total No. of Printed Pages:2

SUBJECT CODE NO:- P-30
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E.(EC/ECT/IEC/E&C) Examination May/June 2017
Microprocessors & Peripheral
(Revised)

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

Please check whether you have got the right question paper.

N.B i) Q.no.1 and Q.no.6 are compulsory
ii) Solve any two from Q.no.2, Q.no.3, Q.no.4 and Q.no.5
iii) Solve any two from Q.no.7, Q.no.8, Q.no.9 and Q.no.10
iv) assume suitable additions data if necessary

Section A

Q.1 Attempt any two of the following
1) Give the hardware evolution of Intel's Microprocessor family 05
2) What-is the need of demultiplexing address/data lines in 8085, How you will carry out demultiplexing. 05
3) Enlist the different-addressing modes available in 8085 microprocessor 05
4) What is stack? Explain the working of stack in 8085. 05

Q.2 a) Draw the timing diagram of the following instruction 07

6000	Op code	LHLD	2500H
6001	00		
6002	25		

b) Write 8085 based program for block transfer of data bytes from source memory to destination memory 08

Q.3 a) Explain the function of following pins in 8085 08
1) HOLD 2) Reset 3) Ready 4) IO/$\overline{M}$
b) Write 8085 based program to add ten data bytes-while addition take carry into consideration. 07

Q.4 a) Write a program to generate a time delay of 5 sec. using 8085. Assume system clock of 3MHZ 07
b) Enlist the different data transfer schemes available in 8085- explain DMA method of data transfer. 08

Q.5 a) Write a routine to enable RST 5-5 and disable RST 6.5 and RST 7.5 interrupt 07
b) Design a fully decoded memory system that provides 4 KB of EPROM immediately followed by 2KB of RAM. The EPROM starts at address 0000H. 08

Section B

Q.6 Attempt any two of the following
1) Enlist the salient features of 8255 05
2) Explain how you will timer of 8155 05
3) Enlist the salient features of 8259 05
4) Give the scheme of measurement of frequency with the help of processor 05

Q.7 a) With the help of neat diagram, explain interfacing of a seven segment display with 8085, and write a program to implement decimal counter. 07
b) With the help of neat diagram explain DAC08 interfacing with 8085. Write a program to generate triangular waveform using this. 08

Q.8 a) Write a program to generate a continuous square wave of 5 KHz using 8253. Assume clock frequency of 07

1 MHz.

b) With the help of block diagram explain the use of 8251 USART. 08

Q.9 a) Give the scheme of speed control of D.C motor using 8085 07

b) What is logic analyzer? With the help of diagram explain it. 08

Q.10 a) It is required to interface a stepper motor with 8085, stepper motor is having 400 steps/Rev. write a program to rotate the motor through 90^0 07

b) Explain how you will use BSR mode of 8255. 08

Total No. of Printed Pages:1

SUBJECT CODE NO:- P-63
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E.(ECT/E&C) Examination May/June 2017
Digital Communication
(Revised)

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

Please check whether you have got the right question paper.

N.B i) Q.No.1 from section A and Q.No.6 from section B are compulsory.
ii) Attempt any two questions from the remaining questions in each section. from Q.2 to Q.5 and Q.7 to Q.10

Section A

Q.1	Solve any two question from following		10
	1)	Discuss briefly on band width requirement of digital modulation system	
	2)	Compare digital modulation & analog modulation	
	3)	How aliasing effect occurs? How it can be avoided?	
	4)	Explain the aperture effect in brief	
Q.2	a)	Compare various sampling techniques with their limitations	08
	b)	Explain the process of random variables and stoachastic process	07
Q.3	a)	State and prove sampling theorem how the signals are reconstructed?	08
	b)	A along signal of 47mw is applied to a pulse code modulator. he signal varies between +4.9v to -4.9 v A SQNR of 24 dB is to be maintained .calculate the numbers of bits required with step size Assume quantization is uniform	07
Q.4	a)	What is the inter symbol interference? How it can be reduced? Discuss on ideal solution?	08
	b)	What is matched filter? Derive the expression of probability of error in the system	07
Q.5	a)	Discuss reconstruction methods of sampling for low and band pass filter	08
	b)	Define noise. explain different type of noise and discussion of probability density function in white noise	07

Section -B

Q.6	Solve any two from following		10
	1)	Discuss the necessity of spread spectrum technique	
	2)	Give significance of noise in transmitted signal with their detection process	
	3)	Differential between natural, flat top and the instantaneous sampling	
	4)	Explain the pulse amplitude? Pulse width modulation.	
Q.7	a)	Draw the bock diagram of delta modulation and describe each bock in detail .state various types of distortions observed in d.m process	08 07
	b)	Draw necessary block schematic for QPSK and explain the functions briefly	
Q.8	a)	Draw and explain the block diagram for pulse code modulator transmitter & receiver	08
	b)	Explain adaptive data modulator & state the benefits over the delta modulator	07
Q.9	a)	Explain the process of amplitudes shift keying and state its merit & demerit	08
	b)	Explain the minimum phase shift keying with suitable examples	07
Q.10	a)	Explain direct sequence spread spectrum and state its advantages	08
	b)	discuss briefly about slow and fast frequency hopping	07

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Total No. of Printed Pages:2

SUBJECT CODE NO:- P-95
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E.(EC/ECT/IEC/E&C) Examination May/June 2017
Analog Integrated Circuit & Applications
(Revised)

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

Please check whether you have got the right question paper.

N.B i) Q.No.1 and Q.No.6 are compulsory.
ii) Attempt any two questions from question No.2, 3, 4, 5 and solve any two question from question no. 7,8,9, and 10 .

Section A

Q.1 Answer any five question from the following 10

1) What is an Ideal op-amp?
2) Explain the concept of virtual ground
3) Determine the output voltage for the configuration shown in fig-(a)

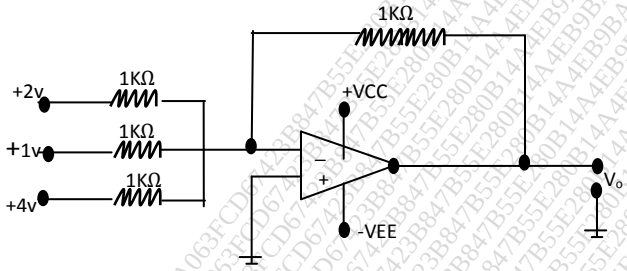

Fig.(a)

4) What is Analog multiplies?
5) What is peak detector?
6) Draw As table multivibrator circuit using IC555
7) Draw precision full wave rectifier

Q.2 a) Explain the Dominant pole and feed forward compensation techniques of op-amp 08
b) Draw and explain in brief the three popular packages available for op-amp 07

Q.3 a) For the instrumentation amplifier shown in fig(b) determine the value of R_G if the gain required is 1000 08

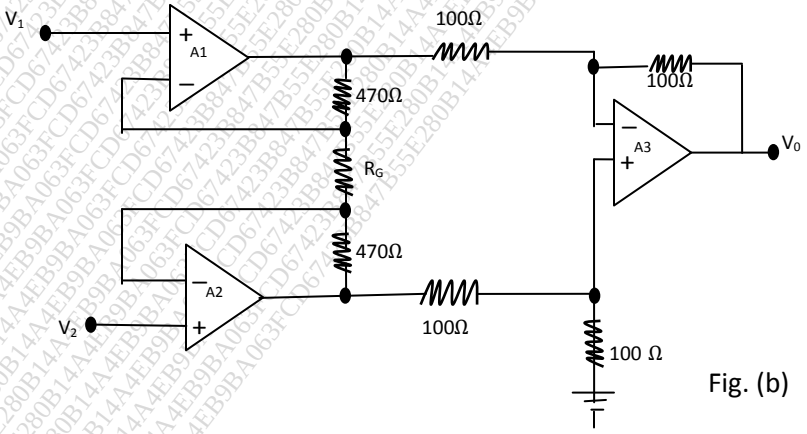

Fig. (b)

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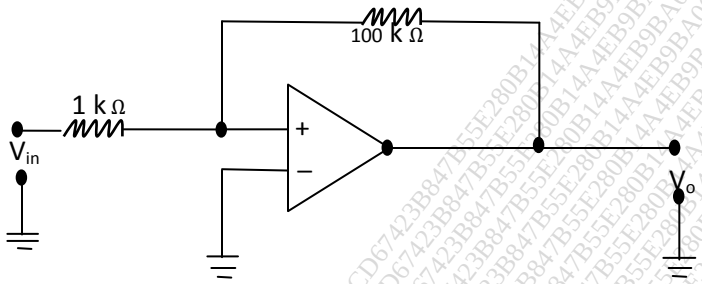
b) Explain the operation of Low voltages dc voltmeter using op-amp 07

Q.4 a) Explain with neat circuit diagram the operation of "Regenerative comparator circuit" 08

For a noninverting regenerative comparator shown in fig (c)calculate tripping voltages Assume $V_{sat} = \pm 13.5V$



Fig(c)

b) Explain the operation of triangular waveform generator 07

Q.5 Write notes on 15

a) Phase shift oscillator op-amp
b) Zero crossing detector
c) Differential amplifier

Section -B

Q.6 Write the answer of following question (any five) 10

1) Draw the second order high pass Butterworth filter
2) State the active filter performances consideration
3) What do you mean by transients response of PLL?
4) What is digital phase detector
5) Draw the block diagram of IC LM 565
6) What is All pass filter ?
7) What is source regulation ?

Q.7 a) What is state variable filter? Explain 08

b) Design a first order low pass filter for a high cut off frequency of 2 KHz and pass band gain of 2 07

Q.8 a) Explain the operation of PLL as a 'frequency Translation'. 08

b) What is Lock in Range capture range and pull in time in PLL? 07

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

b) What is switching regulator? Explain any one application of IC 78s 40 07

Q.10 Write notes on 15

a) KRC filters
b) CD4046 CMOS PLL
c) V.C.O

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Total No. of Printed Pages:2

SUBJECT CODE NO:- P-130

FACULTY OF ENGINEERING AND TECHNOLOGY

T.E.(EC/ECT/IEC/E&C) Examination May/June 2017

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 & 6 are compulsory
ii) Solve any two questions from Q. 2 to 5 & Q. 7 to 10
iii) Assume suitable data as required.

Section A

Q.1 Solve any two from following 10

a) Explain advantages of DSP over ASP.
b) What is ROC? Explain its need in ZT.
c) Draw butterfly structure of DIF Radix-2 FFT algorithm for 8-pt DFT .
d) Explain Single sided ZT.

Q.2 a) Determine ZT Of i) a^n u(n) for all n 08
ii) – a^n . u(-n-1) for all n

b) State & explain properties 8 ZT. 07

Q.3 a) Obtain DFT Of x (n) = { 1,1,2,2,3,3 } 08

b) Explain overlap save method for example 07
h(n) = {1,1,1} & x (n)={ 3,-1,0,1,3,2,0,1,2,1}

Q.4 a) Explain properties of DFT. 07

b) Obtain circular convolution for 08
$x_1(n)$= { 1,2,-1,-2,1,1}
$x_2(n)$= { 1,2,1,2}

Q.5 a) Plot pole zero potter & determine stability of system 07
y (n)=y(n-1)-0.5y(n-2)+x(n)+x(n-1) 08

b) obtain IZT by residue method

$x(Z)=\frac{Z^{-1}}{3-4Z^{-1}+Z^{-2}}$ for | Z |>1

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Section B

Q.6 Solve any two questions 10

a) Specify the difference bet^{n} IIR & FIR Liter
b) Give magnitude & phase response of digital filter.
c) Explain quantization of i/p data & filter coefficient.
d) Explain filter approximation methods.

Q.7 a) Design second order BPF butter worth appx. With pass band of 300 Hz & 500Hz with sampling freq^{n} of 1500Hz using bilinear transformation. The LPF transfer f^{n}is 10

$$H(s) = \frac{\Omega c}{s+\Omega c}$$

b) Explain Fourier series method to design FIR filter. 05

Q.8 a) Determine H(Ƶ) using Impulse invariance method at 5Hz freq^{n} from Ha (s) given as $Ha(s) = \frac{2}{(s+1)(s+2)}$ 08

b) Explain bilinear transformation method to design IIR filter 07

Q.9 a) Explain product quantization error an detail 08

b) Explain quantization error in DFT Computation 07

Q.10 a) Realize digital filter by direct form –I &II Structure with signal flow graph. 08

y(n)=0.79 y(n-1)+1.5y(n-2)+x(n)-1.79x(n-1) 07

b) Explain freq^{n} transformation in digital filters.

SUBJECT CODE NO:- P-188
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E.(I E) Examination May/June 2017
Industrial Drives & Control
(Revised)

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

Please check whether you have got the right question paper.

N.B i) Q.No.1 from section A and Q.No.6 from section B are compulsory.
ii) Attempt any two questions from the remaining questions of each section A and B each.
iii) Assume suitable data, if necessary.
iv) Figure to the right indicates full marks.

Section A

Q.1 Solve any two. 10
i. Compare AC drives with DC drives.
ii. State the advantages of variable speed derive.
iii. Compare electric braking with mechanical braking.
iv. List performance parameters of dc drives.

Q.2 a. Draw the block diagram of three phases fully controlled rectifier fed DC drive and explain its operation. 08
b. A 200V, 875 rpm and 150A d.c. separately excited motor has an armature resistance of 0.06Ω. It is fed from single phase fully controlled converter with an ac source voltage of 220V 50Hz. Assuming continuous conduction calculate 07
i. Firing angle for rated motor torque and 750 rpm
ii. Firing angle for rated motor torque and 500 rpm

Q.3 a. Draw circuit diagram for transistorized stator control method for 3 phase induction motor. Explain working principle, voltage & current waveforms at stator of induction motor. 08
b. A three 440V, 50 Hz, 6 pole star connected IM has following parameters referred to stator side: RS=0.5Ω, Rr'=0.6, Xs=Xr' =1 Ω. Stator to rotor turns ratio is 2. If the motor is used for regenerative braking, determine maximum overhauling torque it can hold and the range of speed in which it can safely operated 07

Q.4 a. Compare CSI and VSI control of induction motor with their relative merits and demerits 08
b. Explain plugging of Induction motor. What precautions are to be taken during plugging operation of Induction motor? 07

Q.5 Write a short notes on: 15
i. Closed loop control of DC series motor
ii. Breaking of DC motor
iii. V/F control method of induction motor through CSI control.

Section B

Q.6 Attempt any two. 10
i. Explain briefly the mechanism of train movement.
ii. Draw the block diagram of cycloconverter fed synchronous motor and explain its operation.
iii. Describe the dynamics of electrical drives.
iv. Explain on what factors stability of drive depends.

Q.7 a. Explain the self-controlled synchronous motor drive employing load commutated thyristor inverter 07
b. Explain the operation of synchronous motor when fed from a fixed frequency supply. 08

Q.8 a. Explain following term in case of traction-Average speed, schedule speed, coefficient of adhesion. 07
b. Draw typical speed-time curve and explain different term related to it. 08

Q.9 a. A drive has following parameters T=150 N-m and T_1=100 N-m where N is rpm. Initially the drive is opening in steady state. The characteristics of load torque are changed to T1=-100N-m. Calculate initial and final equilibrium speeds. O7

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b. Explain speed torque conventions and multi quadrant operation of drives. 08

Q.10 Write short note on : 15

i. Desired characteristics of traction motors

ii. Steam engine drive

iii. Stepper motor.

Total No. of Printed Pages:2

SUBJECT CODE NO:- P-212
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E. (EC/ECT/IE/E&C) Examination May/June 2017
Power Electronics
(Revised)

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

Please check whether you have got the right question paper.

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

Section A

Q.1 Solve any two 10

i) Step up cycloconverter

ii) What will happen if positive gate voltage is given to reserve blocking thyristor? Justify.

iii) Dual converter

iv) power Transistor

Q.2 a) Explain V-I characteristics power MOSFET with neat diagram 07

b) " As Gate current increases break over voltage decreases of on SCR", Justify. 08

Q.3 a) Explain the working principle of DIAC with neat diagram & wave forms 07

b) Explain class D commutation technique in detail with required diagram 08

Q.4 a) Explain various performance parameters for 1-Ø full converter? 07

b) A 1-Ø, 230V, 1kw heater is connected across 1-Ø, 230V, 50Hz supply through an SCR. For firing angle delays of 45^{o} & 90^{o}, calculate the power absorbed in the heater element 08

Q.5 a) Explain on –off control method of A.C voltage controller? 07

b) Explain 3-Ø full converter with R-L load with neat circuit diagram & wave forms 08

Section B

Q.6 Solve any two 10
i) Voltage control technique of an inverter
ii) source filter
iii) HF Heating
iv) Temperature controller using SCR

Q.7 a) With a neat circuit diagram & waveform explain working of 3-Ø 120^{o} conduction mode bridge inverter? 08

b) A I – Ø full bridge inverter is operated from 48 V battery and a resistive load of 10 Ω. Determine 07
1) O/P voltage of fundamental frequency,

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2) O/P RMS power
3) Thyristor ratings

Q.8 a) Explain current commutated chopper with neat circuit diagram & waveforms? 08

b) For type –A chopper Vs = 220v, f = 500Hz, T_{on} = 800 μsec, R = 1Ω , , L = 1 mH & E = 72V, 07
a) Find whether I_L is continuous or not
b) compute the I_{max} & I_{min}

Q.9 a) Explain Ring counter with neat circuit diagram & waveforms? 08

b) Explain servo controlled voltage stabilizer? 07

Q.10 a) Explain various control strategies used for obtaining variable O/P voltage from DC chopper 08

b) Explain parallel inverter with neat circuit diagram & waveforms? 07

Total No. of Printed Pages:1

SUBJECT CODE NO:- P-235
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E.(EC/ECT/E&C) Examination May/June 2017
Signal Coding & Estimation Theory
(Revised)

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

Please check whether you have got the right question paper.

N.B i) Q.No.1 and Q.No.6 are compulsory.
ii) Attempt any two questions fromQ.2 to Q.5 in section A
iii) solve any two question from Q.7 to Q.10 in section B .

Section A

Q.1 Solve any two 10
a) Binary erasure channel
b) Mutual information & properties
c) Kraft's inequality

Q.2 a) A source transmit two independent messages with probabilities of K and (1-K) respectively. Prove that entropy is maximum when both the messages are equally likely. plot the variation of entropy (H) as function of probability (P) of the messages. 08 07
b) Describe the representation of Markoff source

Q.3 a) Derive the channel capacity for binary symmetric channel 07
b) Describe in detail channel coding theorem and channel capacity theorem 08

Q.4 a) Explain Shannon – Fano algorithm with one example 07
b) Using Huffman coding find entropy, average length and efficiency 08

M_0	M_1	M_2	M_3	M_4
0.3	0.3	0.2	0.1	0.1

Q.5 a) Describe discrete communication channel in detail 08
b) Explain average information content of symbols in long independent sequences 07

Section B

Q.6 Attempt any two 10
1) G- matrix and H- matrix
2) Encoder for systematic (n, k) cyclic code
3) Tree diagram & Trellis diagram

Q.7 a) Find all code vectors of block code (6, 3) for given generator matrix 08

$$G=\begin{bmatrix} 1\,0\,0 : 0\,1\,1 \\ 0\,1\,0 : 1\,0\,1 \\ 0\,0\,1 : 1\,1\,0 \end{bmatrix}$$

b) Explain encoder of (7, 4) hamming code 07

Q.8 a) The generator polynomial of a (7, 4) cyclic code is G (p) = p^3 + p+ 1 find all code vector for code in systematic from 08 07
b) Explain syndrome calculation error detection and correction circuit with example

Q.9 a) explain time domain & transfer domain approach of convolution code 07
b) Explain Viterbi algorithm with an example 08

Q.10 Write short notes on 15
a) CRC code
b) Performance evaluation of AWGN channel
c) Optimal linear code

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Total No. of Printed Pages:2

SUBJECT CODE NO:- P-266
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E.(EC/ECT/IEC/E&C) Examination May/June 2017
Microcontroller & Advanced Processors
(Revised)

[Time:ThreeHours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B i) Q.No.1 from section A and Q.No.6 from section B are compulsory.
ii) Attempt any two from the Q.No.2 to Q.no.5 from section A and any two from Q.No.7 to Q.No.10 from section B.
iii) Figure to the right indicates full marks.
iv) Assume suitable data whenever necessary.

Section A

Q.1 A Find physical address of data used in following instruction, if DS-8472H, SI=7321H, DI=2446H 05
i. ADD AX,[SI]
ii. MOV[DI],CX
iii. MOV DX, 1234H[SI]

B Identify the addressing modes of following instructions 05
i. INC AX
ii. MOV AX,4C62H
iii. MUL CX
iv. MOV AX,[3200H]
v. MOV DI, 41[SI]

Q.2 A Draw and explain architecture of 8086 08

B Explain in details the stack of 8086 07

Q.3 A Explain the following instructions 08
i. MUL
ii. MOVS
iii. LDS
iv. XOR

B Write an assembly language program for 8086 to divide two 8-bit numbers from memory and store the result, i.e. Quotient and remainder in memory. 07

Q.4 A Design 8086 based system with the following specification 08
i. 8086 in minimum mode
ii. 4KB EPROM
iii. 4KB RAM

B Write an assembly language program for 8086 to add 10 consecutive numbers of 8-bits. 07

Q.5 A Explain keyboard interfacing with 8086 08

B Explain interfacing of steeper motor with 8086. 07

Section B

Q.6	A	Explain the feature of 80386.	05
	B	Explain the feature of 8051.	05
Q.7	A	Explain the following pins of 8051 i. PSEN ii. ALE iii. EA iv. RST	08
	B	Explain the PSW of 8051 in details.	07
Q.8	A	Explain the following instructions i. MOVC A,@A+PC ii. PUSH 6 iii. DIV AB iv. JNZ 1234H	08
	B	WAP for 8051 to transfer the data from internal RAM location 51H to 5AH, to external RAM location 3001H to 300 AH.	07
Q.9	A	Interface 4KB of RAM and 8KB of EPROM with 8051.	08
	B	Explain port 3 of 8051.	07
Q.10	A	Interface LCD with 8051.	08
	B	Explain timers/ counters of 8051 in detail.	07

Total No. of Printed Pages:3

SUBJECT CODE NO:- P-298

FACULTY OF ENGINEERING AND TECHNOLOGY

T.E.(EC/ECT/IEC/E&C) Examination May/June 2017

Electronics System Design

(Revised)

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

Please check whether you have got the right question paper.

N.B i)Q.No.1 and Q.No.6 are compulsory.
ii)Solve any two questions from the remaining questions of each section.
iii)Assume suitable data and component wherever necessary.
iv)Figures to the right indicate full marks.
v)Required data sheet is provided.

Section A

Q.1	Solve any two i)Derive the output equation of Opamp based differentiator. ii)Give the design considerations for DVM. iii)Discuss the various types of transformers. Also explain selection criteria of transformer in design of power supply. iv)List out the characteristics of ideal Opamp.	10
Q.2	a)Design a typical tone control circuit with the help of IC LM 833 with f_1 =30Hz, f_2=10KHz and a $\pm 20dB$ maximum boost/cut at both ends.	08
	b)Design Am demodulator circuit with maximum modulation index of 0.65 and maximum frequency of modulation 4.5KHz. The volume control resistance varies from 0 Ω to 10 kΩ .	07
Q.3	a)Explain Schmitt trigger with neat circuit diagram and wave forms.	08
	b)Design a regulated variable DC power supply using LM 317 IC with following data. Vo= 3V to 20V, load current= 0.5A	07
Q.4	a)List the electrical characteristics of photodiode and phototransistor.	08
	b)Explain voltage to current amplifier using Opamp. State its design specifications.	07
Q.5	Design a data acquisition system to monitor and control of temperature and light.	15

Section B

Q.6	Solve <u>any two</u> i) Explain optocoupler and Relay in electronics circuit. ii) Explain design rules for heat sink. iii) Define the terms MTTR, MTBF and MTTF. iv)Explain Noise due to ground and supply line.	10
Q.7	a)Explain PCB layout considerations for analog and digital circuits.	08
	b)Design a five line to 32 line decoder using i)4 line to 16 line decoder and ii)3 line to 8 line decoder.	07
Q.8	a)Design a step down switching regulator using 78540 IC for 5V output at 500mA. The input voltage is 13V and output ripple is limited to 25mV. Use the design equation for the device assuming divider current I_D=0.1mA and I_Q=2.5mA. Also calculate efficiency of the regulator.	10
	b) Draw and explain block diagram of LM 565.	05
Q.9	a)Explain electronics system design consideration and selection of material for enclosure.	08
	b)Design Mod 9 counter using IC 7490.	07
Q.10	Write short notes on i)Sample and hold circuit ii)Interfacing of relay with digital circuits. iii)Astable multivibrator.	15

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Data Sheet

		Device	Type	Icmax	VcEo	Vcbo	Ptmax	Life min	f_r
1.		General Purpose Transistors:							
	1)	2N 2996	NPN	100 mA	18 V	18 V	200 MW	200	200 MHz
	2)	BFY 51	NPN	1 Amp	30 V	60 V	800 MW		50 MHz
	3)	2N 3702	PNP	200 mA	25 V	40 V	300 MW		100 MHz
	4)	BCY 70	PNP	20 mA	40 V	50 V	300 MW		200 MHz
2.		Small Signal Transistors:							
	1)	BC 107	NPN	100 mA	45 V	50 V	300 MW	110	
	2)	BC 157	PNP	100 mA	45 V	50 V	300 MW	470	
3.		Switching transistors:							
	1)	2N 2219 A	NPN	800 mA	40 V	75 V	800 MW	75	200 MHz
	2)	2N 2905	PNP	600 mA	40 V	60 V	600 MW	150	
4.		RF Transistors :							
	1)	2N 2969 A	NPN	200 mA	15 V	40 V	360 MW	40	500 MHz
	2)	BFY 90	NPN	50 mA	15 V		200 MW		14 GHz
	3)	BC 177	PNP	100 mA	45 V	50 V	300 MW	75	130 MHz
	4)	BC 178	PNP	100 mA	25 V	30 V	300 MW	75	130 MHz
5.		Driver Transistors :							
	1)	2N 3053	NPN	700 mA	40 V	60V	800 MW	125	100 MHz
	2)	2N 2905	PNP	1 A	40 V		600 MW	100	
6.		Power Transistor:							
	1)	2N 3055	NPN	15 A	60 V	100 V	115 W	20	1 MHz
	2)	BD 131	NPN	3 A	45 V	70 V	15 W	20	60 MHz
	3)	BD 132	PNP	3 A	45 V	45 V	15 W	20	60 MHz
	4)	TIP 31 A	NPN	3 A	60 V	60 V	40 W	10	8 MHz
	5)	TIP 32 A	PNP	3 A	60 V		40 W		8 MHz
	6)	SL 100	NPN	0.5 A	50 V		4 W	40	
	7)	SK 100	PNP	0.5 A	50 V		4 W	40	
7.		Darlington Transistors:							
	1)	TIP 132	NPN	8 A	100 V	100 V	70 W	1000	1 MHz
	2)	TIP 137	PNP	8 A	100 V	100 V	70 W	1000	1 MHz

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

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

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

4. Diodes :

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

5. Zener Diodes:

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

Total No. of Printed Pages:2

SUBJECT CODE NO:- P-363
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E.(EC/ETC/IE/E&C) Examination May/June 2017
Feedback Control System
(Revised)

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

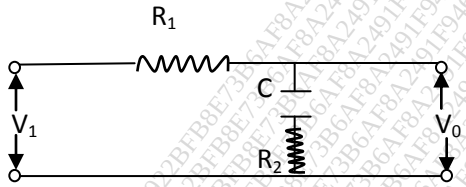
Please check whether you have got the right question paper.

N.B i) Q.No.1 and Q.No.6 are compulsory.
ii) Solve any two questions in each section from Q.2 to 5 & Q.7 to 10.
iii) Figure to the right indicates full marks.
iv) Semi log Graph paper are allowed.
v) Make necessary assumption & state them clearly.

Section A

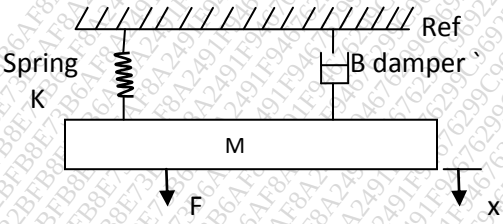
Q.1 Solve any two 10

a) Find the transfer function for lag compensator



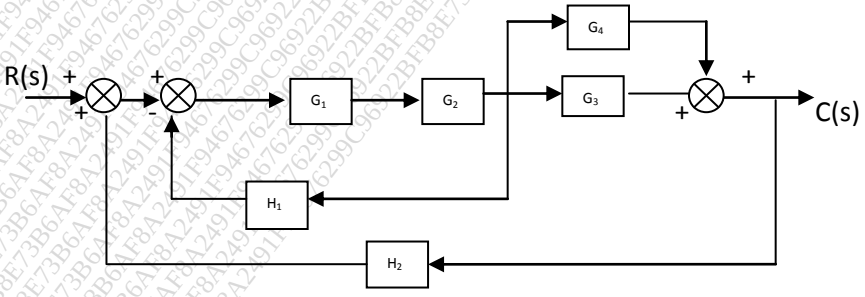
b) Explain the thermal system
c) Explain open loop & closed loop system with one example each.

Q.2 a) For the system shown in fig. write the system equation 08



b) What is meant closed loop control system? Differentiate closed loop and open loop control system with an example. 07

Q.3 a) Find the single block equivalent by block diagram reduction for below ex. 08



b) Explain mason's gain formula. Explain steps for calculation of gain of SFG. 07

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Q.4 a) Explain the time domain specification in detail. Delay time, rise time, peak overshoot, peak time, setting time. 07

b) An unity feedback system has a loop 08

$$T.F\ \ G(s) = \frac{10(s+1)}{s(s+2)(s+5)}$$

Determine 1) stability gain

2) step ramp , parabolic error code

3) steady state error when r(t) =3+10t

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

1) Block diagram reduction rule
2) Steeper motor
3) PID controller
4) Hydraulic system
5) Concept of transfer function

Section –B

Q.6 Write any two question 10

1) R-H criteria note
2) Relative stability in detail
3) Nyquist stability criteria note

Q.7 a) Find the system is stable or unstable using R-H criteria 08

1) $3S^7 + 9S^6 + 6S^5 + 4S^4 + 7S^3 + 8S^2 + 2S + 6$
2) $S^6 + S^5 - 6S^4 - S^2 - S + 6$

b) Write the different rules for sketching the root locus. 07

Q.8 a) Draw the Bode plot. Find am, Pm, Wgc , Wpc & comment on stability 15

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

Q.9 a) Define controllability & observability in detail with one example each. 07

b) Sketch the root locus of a unity feedback control system with an open loop T.F 08

$$G(s) = \frac{k}{s(s+2)(s+4)}$$

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

1) PLC
2) Actuators
3) Steeper motor
4) Concept of fuzzy logic
5) Neural based control system