SE, Sem-IV, Choice base, Electronics, FH2018 08106118

NEW Linear Control System

Q. P. Code: 21731

Time: 3 Hours **Marks: 80**

N. B. 1. Question no. **1 is compulsory**.
2. Attempt any **THREE** questions from remaining.
3. Assume suitable data if required.
4. Figure to the right indicate full marks.

Qu.1 : Solve any **Four** 20 M

(a) Explain the effect of addition of pole and zero to the system.

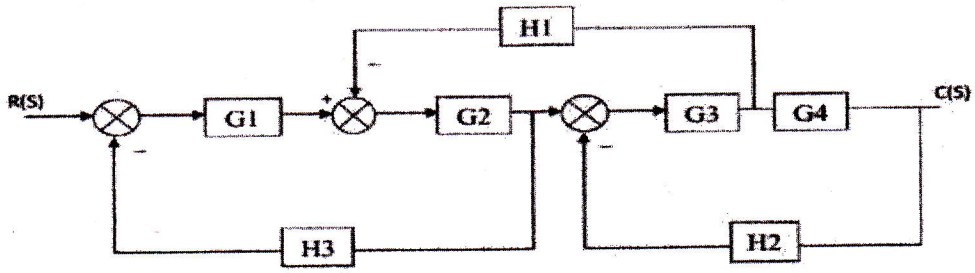
(b) Explain any five rules of Root Locus Plot in detail.

(c) Define Gain margin and Phase margin. Explain how these margins are used for stability analysis.

(d) Explain the Mason's gain formula with reference to Signal Flow Graph Technique.

(e) Explain needs of compensation in control system also explain different types of Compensation with suitable example.

Qu. 2: (a) Using block reduction technique, obtain the transfer function. 10 M



b) Construct SFG for the following set of equation. 10 M

i) $Y2 = G1Y1 - G2Y4$
ii) $Y3 = G3Y2 + G4Y3$
iii) $Y4 = G5Y1 + G6Y3$, Where Y4 is the output.

Obtain the overall transfer function by using Mason's gain formula.

Qu. 3: (a) Explain Controllability and Observability with the necessary condition for stability and Check Controllability and Observability for the system 10 M

$$\dot{x} = \begin{bmatrix} 0 & 6 & -5 \\ 1 & 0 & 2 \\ 3 & 2 & 4 \end{bmatrix} x + \begin{bmatrix} 0 \\ 1 \\ 2 \end{bmatrix} u$$

$$y = [1 \quad 3 \quad 0]x$$

(b) Explain PID Controller and Model Predictive control system in detail? Also list its advantages. 10 M

Qu. 4: (a) Construct the Routh array and determine the stability of the system whose characteristics equation is 10 M

$$S^6+2S^5+8S^4+12S^3+20S^2+16S+16=0$$

(b) Sketch the root locus for a unity feedback control system and forward transfer function is 10 M

$G(S)=\frac{K(S+3)}{S(S+2)(S+1)(S+4)}$. Find the frequency and gain K for which the root locus crosses the imaginary axis. For what range of k is the system stable?

Qu. 5: (a) Construct the Bode Plot for the open loop transfer function. Comment on Stability. $G(S)=\frac{288\,(S+4)}{S(S+1)(S^2+4.8\,S+144)}$ and $H(S)=1$. 10 M

(b) State and Prove properties of State Transition matrix. Obtain the state model for the system with transfer function $\frac{Y(S)}{U(S)}=\frac{3S+4}{S^2+5S+6}$ 10 M

Qu. 6: (a) Sketch the Nyquist plot for a given open loop transfer function 10 M

$G(s).H(s)=\frac{1}{(s+1)(s+2)}$ And comment on the stability of the system.

(b) A unity feedback system has $G(S)=\frac{20(S+1)}{S^2(S+2)(S+4)}$ Find 10 M

i. All static error co-efficient (Kp, Kv, Ka).
ii. Steady State Error of ramp i/p with magnitude 4.

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SE, Electronics, Sem.-IV, Choicebase, FH2018 04/06/18

Principles of Comm. Engg.

NEW

Q.P. Code : 50776

(3hours) **Total Marks:80**

NB: 1. Question number 1 is compulsory
2. attempt any 3 questions from the remaining five questions
3. Assume suitable data wherever needed

Q.1 **Attempt any 5 questions** 20

a) Why do we modulate a signal for transmission? Explain.

b) A single tone FM signal is given by
$e_{FM}(t) = 20 \cos(16\pi 10^6 t + 25 \sin 2\pi 10^3 t)$.
find the modulation index, modulating frequency , deviation , carrier frequency and power in the FM signal

c) Compare Amplitude Modulation and Frequency Modulation in terms of
i) bandwidth, ii) signal quality, iii) effect of noise on the signal and iv) range

d) Draw a well labeled diagram of a super-heterodyne receiver.

e) Explain Shannon's Sampling theorem and explain aliasing error.

f) Compare TDM and FDM.

Q.2 a) An AM signal is produced by modulating a carrier signal with peak voltage of 10V and frequency of 100KHz by an information signal with max. modulating frequency of 5KHz and max amplitude 4V. Determine: 10

a) Frequency limits for lower and upper sideband
b) Bandwidth of AM
c) Total power of the modulated wave if the load resistance, $R_L = 10\ \Omega$
d) Draw the power spectrum.
e) Calculate the total transmitted current.

b) What are the methods employed for generation of SSB? Explain the third method of SSB generation with its advantages and disadvantages. (10)

Q.3 a) Explain the indirect method of FM generation. (8)

b) What is image frequency and its rejection? Also explain double spotting. (6)

c) In a Super heterodyne receiver having no RF amplifier , the loaded Q of the antenna coupling circuit is 80. If the IF is 455Khz, calculate the image frequency and its rejection ratio for tuning at (i) 100 kHZ (ii) 20 MHz. (6)

Q.4 a) What is multiplexing in communication system? Draw a block diagram of frequency division multiplexing to transmit 5 SSB signals. (6)

b) Draw and explain the transmitter and receiver of Delta modulation. What is meant by slope overload distortion? (10)

c) Bring out the merits and demerits of adaptive Delta modulation (4)

Q.5. a) With the help of a neat block diagram explain the generation and detection of a PPM signal. Also explain the merits and demerits of a PPM transmission. (8)

b) Explain the terms :Selectivity , Fidelity , Sensitivity , AGC (8)

c) Explain companding (4)

Q.6 **Write short notes : any four** (20)

a) Block diagram of PCM Transmitter and receiver
b) T1 digital carrier system
c) TRF receiver , its merits and demerits
d) Foster Seelay discriminator method
e) Pre-emphasis and deemphasis circuits

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SE| IV | choice Based | GTRX | DSD | 29/05/18

Sub:- Digital System Design

Q. P. Code: 50453

[Time: 3 Hours] [Marks:80]

N.B: 1) Question no. 1 is compulsory.

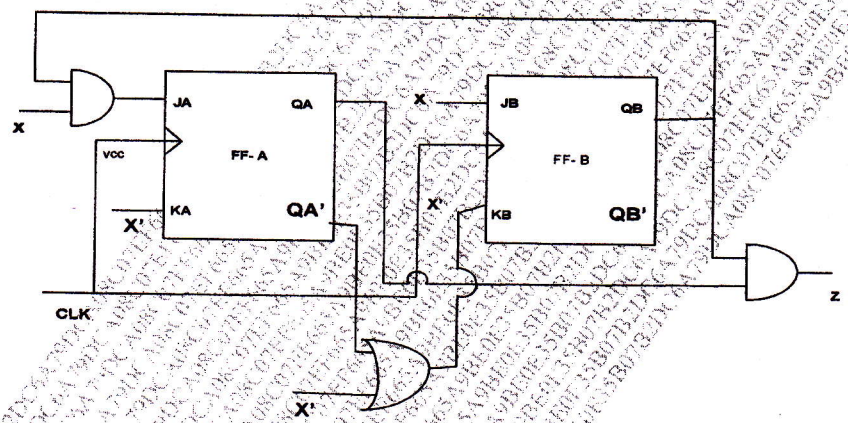
2) Attempt any three out of the remaining five questions

3) Use suitable data, wherever necessary.

Question 1: Attempt **any four** questions from the following. (20)

I. I) Differentiate between Mealy Machine and Moore Machine
II. Draw the Standard symbols for ASM Charts.
III. Compose VHDL code for Implementation of D Flip Flop
IV. Differentiate between signal and Variable.
V. Differentiate between IC 7490, IC 7492, IC 7493

Question 2 (A) Analyse the sequential circuit shown below. Derive the excitation equation, Transition table and state diagram. (10)



Question 2 b) Draw the data unit for the following RTL description (10)

Module; Data Mover
Memory: A [2]; B [2]; C [2].
Inputs: X [2].
Outputs: Z [2].

1. A ← X.
2. C ← $\bar{A}$.
3. B ← X [1], X [0].
4. C ← A V B.
5. Z = C.

End sequence.

Question 3(A) Shown below is the state table for sequential machine, using implication chart method, eliminate redundant states and obtain minimized state diagram. (10)

X1X2	00	Z	01	Z	10	Z	11	Z
A	D	0	D	0	F	0	A	0
B	C	1	D	0	E	1	F	0
C	C	1	D	0	E	1	A	0
D	D	0	B	0	A	0	F	0
E	C	1	F	0	E	1	A	0
F	D	0	D	0	A	0	F	0
G	G	0	G	0	A	0	A	0
H	B	1	D	0	E	1	A	0

Question 3(B): Construct ASM chart of sequence detector which detects the sequence 1001. The output Z becomes 1 along with the last correct bit of the sequence. (10)

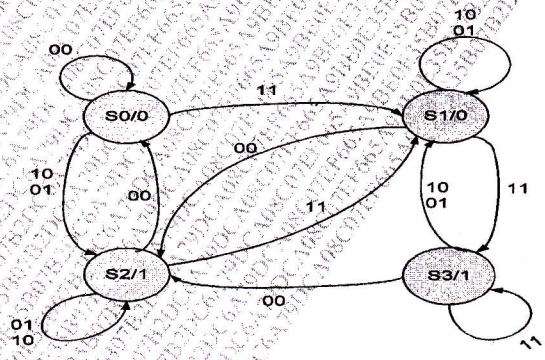
Question 4(A): Create VHDL code for Implementation of 4:1Multiplexer using two different architecture modelling styles.

Question 4(B): Design a MOD 61 up counter using IC 74163 and explain its working. (10)

Question 5(A): Design full subtractror using PLA. (10)

Question 5(B): Explain input-output block architecture for FPGA 4000 family. (10)

Question 6 (A): Write VHDL code for the state diagram given below. (10)



Qustion 6(b): Evaluate the value of output variable for following signal declarations. (10)

```
SIGNAL a: BIT: = '1';
SIGNAL b: BIT_VECTOR (3 DOWNTO 0):= "1100";
SIGNAL c: BIT_VECTOR (3 DOWNTO 0):= "0010";
X1 <= c & b;      ------ X1< =_____
X2 <= b XOR c;    ------ X2< =_____
X3 <= b sll 2;    ------ X3< =_____
X4 <= b rol 3;    ------ X4< =_____
X5 <= a AND NOT b (0) AND NOT c(1); ----X5<=_____
```

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SE|IV| choice band | ETRX | EDC-II | 17|05|18

QP CODE : 37283

EXTRA

[Time: 3 Hours] [Marks: 80]

Please check whether you have got the right question paper

N.B : 1. Question No.1 is **compulsory.**

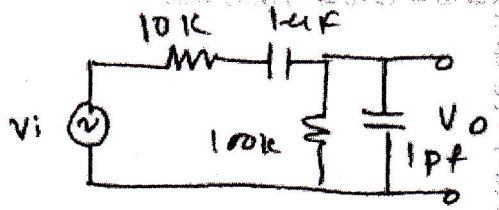
2. Attempt **any three** questions from remaining.

3. **All** questions carry **equal** marks.

4. Assume suitable data wherever necessary.

1. Attempt **any four** of the following

(a) Draw general frequency response of an amplifier. Determine corner frequencies for the following . **5**



(b) Compare MOSFET diffamp with passive load and active load. **5**

(c) Calculate max power dissipaton with and without heat sink. **5**

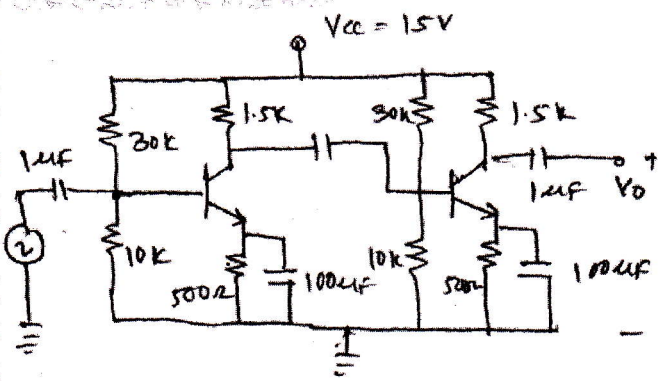
$\theta jc = 1.5°C/W, \theta_{CS} = 1°$ c/w, $\theta_{CA} = 50°C/W$

$\theta_{JA} = 4°C/W, T_{jmax} = 100°C, T_{Amb} = 25°C$

(d) State and explain Barkhausen criteria. **5**

(e) Explain working of SCR. Define I_L and I_H. **5**

2. (a) Determine voltage gain , i/p and o/p impedance for the two stage amplifier shown below. **10**



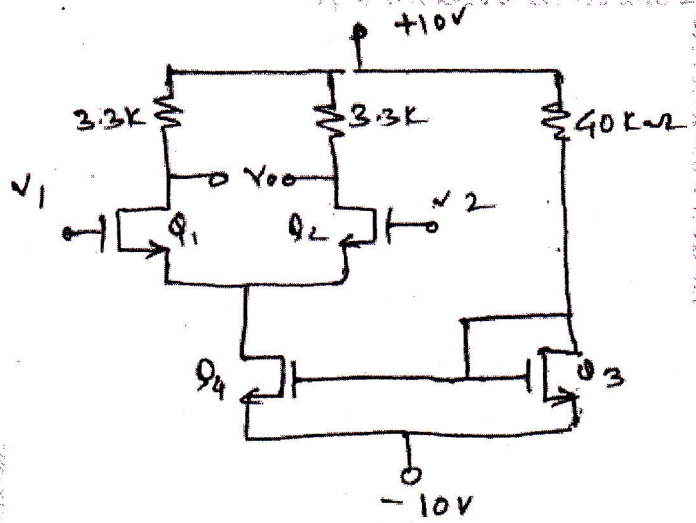
Assum $V_{BE} = 0.7v$, $\beta_1 = \beta_2 = 150$

(b) Explain working of RC phase shift oscillator. Give expression for frequency of oscillations. **10**

3. (a) Draw block diagram of voltage series negative feedback. Derive formulae for A_{vf}, R_{if}, R_{of}. **10**

(b) Explain working of UJT with the help of characteristics. Hence explain relaxation oscillator. **10**

4. (a) Determine I_{DQ}, V_{GSQ} and differential mode gain for following circuit. Assume Kn = 0.15 mA/v², (VA) = 100 V VT = 1.5 V. **10**



(b) Draw circuit diagram of class A Transformer coupled amplifier. Explain working, Draw AC/DC load line. Derive expression of efficiency. **10**

5. (a) Explain high frequency response of CS-MOSFET amplifier with proper equation. Discuss effects of parasitic capacitances. **10**

(b) Explain use of constant current source in Diff amps. Give description of any one type. **10**

6. Solve **(Any Three)** **20**

(1) Cascode Amplifier working

(2) Gunn diode and it's applications

(3) Crossover distortion and methods to remove in class B amplifier

(4) Hartley oscillator.

SE | Sem-IV | choice based | ETRX | MA | 23/04/18
Sub:- Microprocessors & Applications

Q. P. Code : 40468

[Time: 3 hours] [Max Marks 80]

1) Question no. 1 is compulsory
2) Solve any three from the remaining five questions.
3) Assume suitable additional data if necessary.

Q1) Answer the following questions: (20)
a) Explain the feature of pipelining and queue in 8086 architecture.
b) Explain the significance of TEST*, RESET and MN/MX* signals in 8086 processor
(* indicates bar).
c) List the steps taken by 8086 processor in response to receiving an interrupt.
d) In 8086 bus cycle, explain the significance of ALE signal.
e) Explain the flag register for 8086 processor.

Q2)a) List and explain with examples addressing modes of 8086 processor. (10)
b) Explain with the help of neat diagram interfacing of 8086-8087 closely coupled configuration system. (10)

Q3)a) With the help of memory map interface the following to an 8086 based system operating in minimum mode: (14)
a) 32K bytes of EPROM memory using 8k byte devices.
b) 32K bytes of RAM memory using 8k byte devices.
c) One 16 - bit input and output port.
b) Explain the following 8086 instructions (ANY THREE)
a) CMPSB b) DIV AX c) LOOPE again d) REP SCASB e) XLATB (06)

Q4) a) Write a detailed note on the interrupt structure of 8086 processor. (10)
b) Explain the need for DMA and modes of DMA data transfer typically made use of by the DMA controller IC - 8237. (10)

Q5) a) b) Explain the Intel Pentium processor's pipelining and superscalar architecture. (10)
b) With the help of a neat flowchart/algorithm write a program in 8086 assembly to arrange a set of ten 8-bit numbers initialized in data segment in ascending order. (10)

Q6) Write short notes on: [ANY TWO]
a) Programmable interrupt controller – 8259. (10)
b) Intel Pentium processor – Branch Prediction Logic (10)
c) Programmable peripheral interface – 8255, need for and operation in Mode – 1. (10)

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BE, sem.-IV, Electronics, Choice base, FH2018
Am.-IV
11/05/18

Q. P. Code: 38423

(3 Hours) Total Marks : 80

N.B.: (1) Question no. 1 is compulsory.
(2) Attempt any 3 questions from remaining Q. 2 to Q. 6.
(3) Use statistical tables wherever required.
(4) Figures to right indicate full marks.

Q1

a Find the coefficient of correlation from the following data: N=10 , $\sum X$=225 $\sum Y$=189 , $\sum(X-22)^2$=85 $\sum(Y-19)^2$=25 — 5

b Evaluate $\int_c logzdz$ where c is |z| =1 — 5

c Find the projection of u=(3,1,3) along and perpendicular to v=(4,-2,2) — 5

d Find an eigen values of(i) Adj(A) (ii) $24A^{-1}+2A-I$ Where A= $\begin{pmatrix}1&2&3&-2\\0&2&4&6\\0&0&4&-5\\0&0&0&6\end{pmatrix}$ — 5

Q2

a Find the extremal of $\int_0^1(y^{"2}+x^2-y^2)dx$ — 06

b Use Gram-Schmidt process to transform the basis {u_1 ,u_2 ,u_3} in to orthonormal bases where u_1 =(1 ,1 ,1) ,u_2 =(0,1,1),u_3=(0,0,1) — 06

c Show that the matrix A= $\begin{bmatrix}-9&4&4\\-8&3&4\\-16&8&7\end{bmatrix}$ Also find diagonal and transforming matrix — 08

Q3

a If X is a normal variable with mean 10 and standard deviation 4,Find (i)P[|$X-4$|<1] (II)p [5<x<18] (iii)P[X<12] — 06

b Seven dice are thrown 729 times .How many times do you expect at least four dice to show 3 or 5 — 06

c Using Rayleigh –Ritz method find solution for the extremal of the functional $\int_0^1(2xy-y'^2-y^2)dx$ given y(0)=0 and y(1) =0 — 08

Q4

a For the 50 students in the class mean of X is 62.4 and 16Var(X) = 9 Var(Y).Regression line of X on Y is 3Y-5X +180=0 Find (i)Mean of Y (ii)Correlation r between X and Y (iii)Regression line of Y on X — 06

b Evaluate $\int_c \frac{z+1}{(z^3-2z^2)}dz$ where c is (i) |z|=1 (ii)|$z-2-i$|=2 (ii) |$z-1-2i$|=2 — 06

c Check whether the set of all pairs of real number of the form (1,x) with operations (1,y)+(1,x)=(1,y+x) and k(1,y)=(1,ky) is a vector Space — 08

Q5

a Using Cauchy residue theorem evaluate $\int_0^\infty \frac{1}{(x^2+1)(x^2+9)}dx$ — 06

b If A= $\begin{bmatrix}1&0&0\\1&0&1\\0&1&0\end{bmatrix}$ find A^{50} — 06

c Find M.G.F. of Poisson distribution .Hence find it's mean and variance — 08

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Q6

a Is the matrix A derogatory? justify your answer where $A=\begin{bmatrix} -2 & 0 & 1 \\ 1 & 1 & 0 \\ 0 & 0 & -2 \end{bmatrix}$ 6

b A random variable X has the following p.d.f. 6
$f(x) = kx^2e^{-x}$ for $x > 0$ .and $f(x)=0$ otherwise .Find (i) k (ii) mean (iii) variance (iv)M.G.F. (v) c.d.f. of X (vi) $P[0<X<1]$

c Find all possible Laurent's series of $f(z) = \frac{z^2-1}{z^2+5z+6}$

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