B.E. Sem IV Choice Base (Elec. Engg) May 2018

Mathematics IV

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

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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SE/Sem-IV (choice based)/ETRX/EDC-II/M-18.

QP CODE : 37283

[Time: 3 Hours] [Marks: 80]

Please check whether you have got the right question paper

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

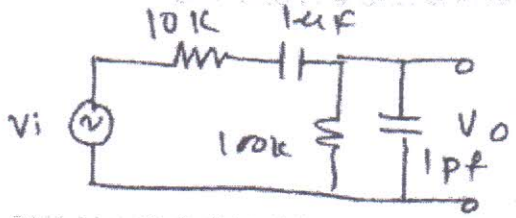
2. Attempt **any three** questions from remaining.

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

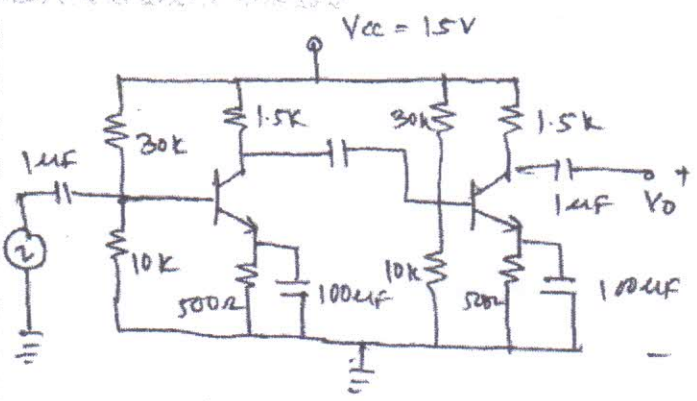
$\theta jc = 1.5°C/W, \theta_{CS} = 1°$ c/w, $\theta_{CA} = 50°C/W$

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

(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



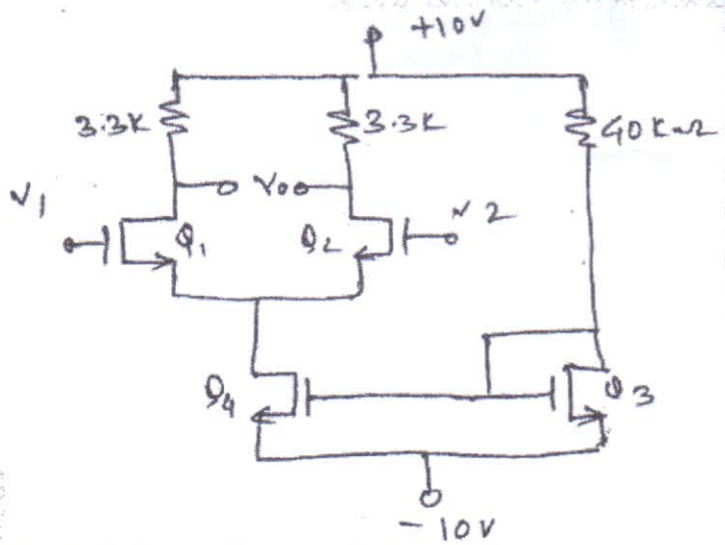
Assum $V_{BE} = 0.7V$, $\beta_1 = \beta_2 = 150$

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

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

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

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.



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

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

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

6. Solve **(Any Three)**

(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/ETRX / Sem-IV [CHOICE Based] / Microprocessors & Applications / May-18

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) (06)
a) CMPSB b) DIV AX c) LOOPE again d) REP SCASB e) XLATB

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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S.E. Sem IV (Choice Base) May 2018
DSD (Electronics Engg)

Q. P. Code: 50453

[Time: 3 Hours] **[Marks:80]**

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

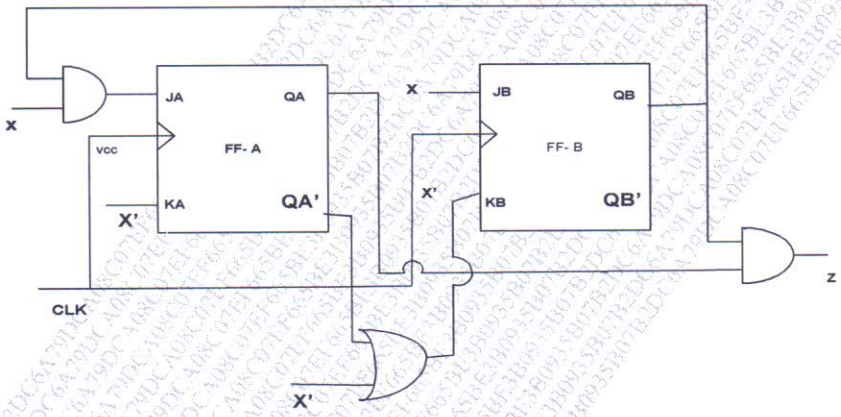
2) Attempt any three out of the remaining five questions

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)

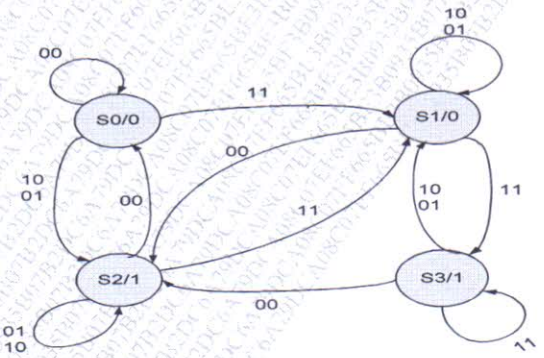
Question 4(A): Create VHDL code for Implementation of 4:1Multiplexer using two different architecture modelling styles.

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)

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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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S.E. Sem IV (ET) (Choice Base) May 2018.

Prin. of Comm. Engg

Q.P.Code: 39180

[Time: 3 Hours] **[Marks:80]**

NB:

1. Q. 1 is compulsory
2. Attempt any three questions out of remaining five.
3. Figure to the right indicate full marks.
4. Assume suitable data if required and mention the same in solution.

Q.1 Solve the following 20

a) Distinguish between narrowband and wideband FM.
b) What is companding?
c) Why AGC is required in radio receivers?
d) Explain aliasing error and aperture effect.
e) Explain various types of noise affecting communication system.

Q.2a) What are the drawbacks of delta modulation? Explain adaptive delta modulation in detail. 10

b) What is signal multiplexing? Explain TDM and FDM in detail. 10

Q.3 a) State and prove sampling theorem for low pass bandlimited signals. 10

b) Explain practical diode detector with suitable diagram. 10

Q.4 a) What are different methods of FM generation? Explain reactance modulator in detail. 10

b) Explain how PPM is generated from PWM 10

Q.5 a) Explain superheterodyne receiver 10

b) Explain VSB transmission 10

Q.6 Write note on (any four) 20

1. Quadrature amplitude modulation
2. Amplitude limiting and thresholding
3. Double spotting
4. Low level and high level modulation
5. PCM and DPCM
