SE- SEM IV (R-2007) (old)
ETRX
EEMJM

06/06/16

Q.P. Code : 547202

(3 Hours) **| Total Marks:100**

N.B. : (1) Question **No. 1** is compulsory.
(2) Attempt any **four** questions out of remaining **six** questions.
(3) Assume suitable data required.
(4) **Each** questions carry **equal** marks.

1. (a) What is back emf. Explain its significance. **5**
(b) Explain multirange ohmmeter with neat diagram. **5**
(c) Working of power factor meter. **5**
(d) Explain the function of deley line in CRO. **5**

2. (a) Explain any two types of ADCs in detail. **10**
(b) Explain starting methods of Induction Moter **10**

3. (a) Explain different methods of speed control of DC moter. **10**
(b) Explain digital phase meter using Flip-Flop Write its advantage and dis-advantages. **10**

4. (a) What is z- modulation in CRO and for what purpose it used. Can frequency and phase difference be measured using z-modulation. **10**
(b) Draw front panel of dual-trace CRO & explain its in details. **10**

5. (a) Derive the torque equations for moving Iron Meter. **10**
(b) Discuss briefly the different types of DVM. **10**

6. (a) Explain Wheatstone's bridge in detail. **10**
(b) Explain Schering bridge for capacitance measurements. **10**

7. Write short notes. **(only three)** **20**
(a) Megger
(b) DSO
(c) Stepper motor
(d) FET voltmeter

SE - Sem - IV (OLD) - Electronics 31/05/16
Basics of Analog & Digital Comm system

Q.P. Code : 547101

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question **one** is **Compulsory**
(2) Solve any **four** from reaming **six** questions
(3) Assume suitable data if necessary

1. (a) Justify modulation allow to reduce height of antenna. **20**
   (b) Compare A.m with F.M.
   (c) Explain sampling theorem
   (d) Explain T.D.M.

2. (a) What is need of modulation? **10**
   (b) What is S.S.B. system? explain any one SSB generation method. **10**

3. (a) Explain VSB system. **10**
   (b) Explain power spectrum of A.M. **10**

4. (a) Explain superheterodyne radio receiver **10**
   (b) Explain A.M Demodulation technique. **10**

5. (a) Explain F.M. Indirect F.M. generation technique. **10**
   (b) Explain Noise triangle. **10**

6. (a) Explain F.D.M **10**
   (b) Explain P.C.M system. **10**

7. Write short notes on any **three** **20**
   (a) Delta modulation
   (b) ISB system
   (c) Frequency mediation
   (d) Modulation Index of A.M

SE- SEM IV (OLD) ETRX 25/5/16

Electronic Circuit Analysis & Design.

Q.P. Code : 547001

(3 Hours) **| Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory**
(2) Solve any **four** questions from question No **2 to 7**.
(3) Assume suitable data wherever necessary.

1. Solve any **four** questions from the following **20**
   (a) What is the role of coupling and bypass capacitors in BJT amplifier
   (b) How Bark-Hausen criteria should be satisfied in RC phase shift oscillator circuit
   (c) What are different types of power Amplifiers, explain each type with respect to operating point.
   (d) How differential amplifier is different than normal amplifier.
   (e) What is need of Multistage amplifier.
   (f) What are different types of -ve feedback amplifier, draw block diagram of one of the type.

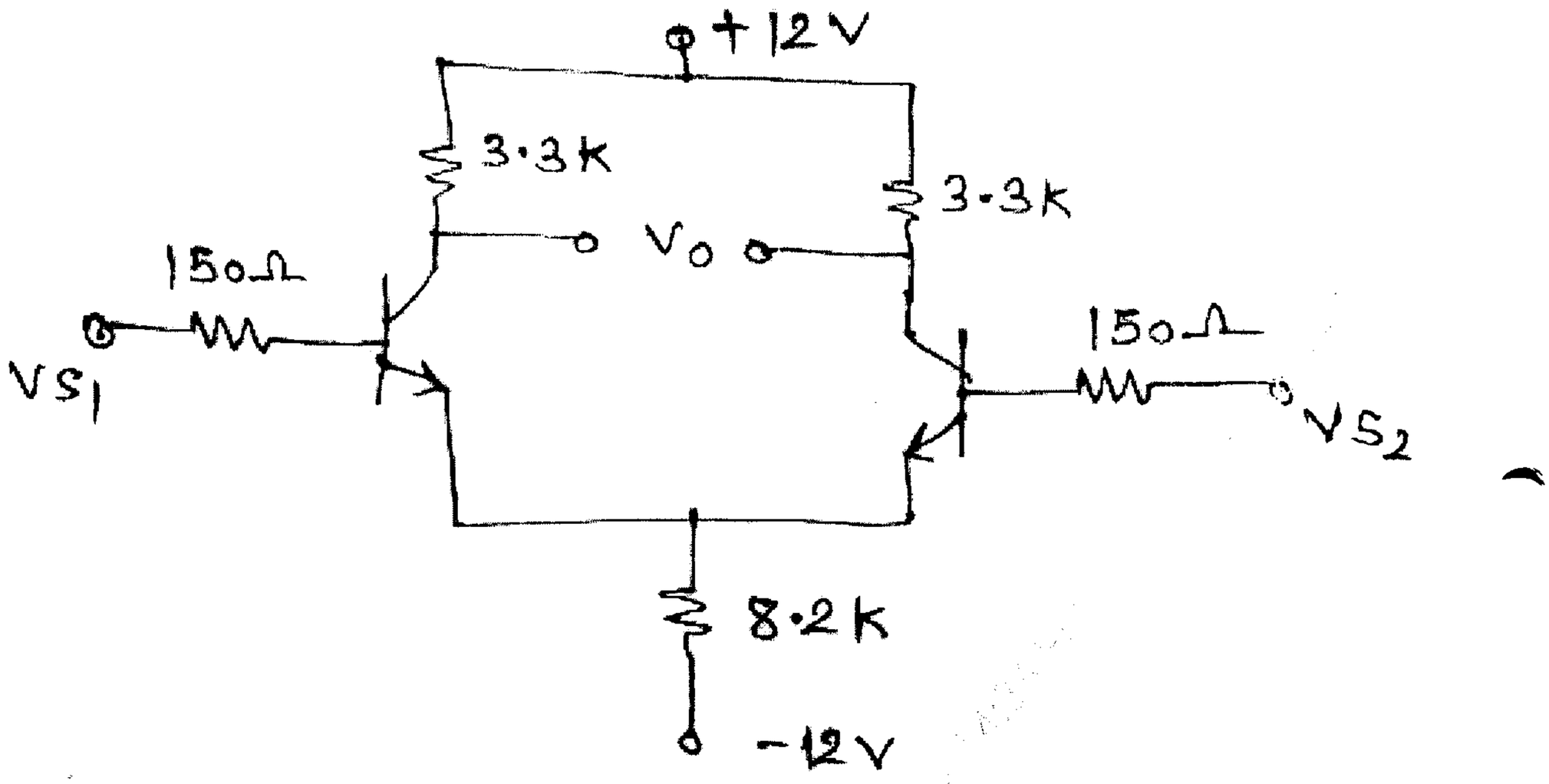
2. Design a Two stage R-C coupled CE amplifier to get **20**
   $A_V > 700$, $S_{ICO} = 9$, $Ri > 3K\Omega$, $f L = 20Hz$.
   use suitable biasing circuit and suitable BJT transistor from data sheet.

3. (a) Explain class A power amplifier in detail. **10**
   (b) Draw neat diagram of colpitt oscillator, explain its working with Advantages and Disadvantages. **10**

4. (a) Explain Low frequency response of BJT Amplifier. **10**
   (b) Design an RC Phase shift oscillator using JFET, to produce an output frequency of 1KHz, **10**
   Given : VDD = 10V, gm = 4 mS,
   Vp = - 4V, IDSS = 10 mA

5. (a) Design class B power amplifier for Po = 20W and RL = 10 Ω **10**
   (b) For the differential amplifier shown calculate **10**
   (i) Operating point 1Cq and VCEq
   (ii) Voltage gain Ad.

[TURNOVER



Assume hfe = 100 and hie = 1KΩ

6. (a) Derive equations of Af, Rif and Rof for current- series-ve feedback amplifier **10**

   (b) Derive equations of Ad, Ri and Ro for Dual input, Balanced output differential amplifier. **10**

7. Write short notes on Any **Four :-** **20**

   (a) Frequency Response of Amplifier
   (b) Need of constant current source in differential amplifier
   (c) CASCODE Amplifier
   (d) Properties of -ve feedback Amplifier
   (e) Heat sink

	Watts	Amps			d.c.	d.c.					current	gain	Small	Signal	h_{fe}	V_{AE}	θ_{ja}	Derate
	115.5	16.0	1.1	100	60	70	90	7	200	20	60	70	15	50	120	1.8	1.5	0.7
											50	100	25	75	125	1.5	3.5	0.4
ECN 100	5.0	0.7	0.6		60			6	125	115	180	220	125	220	250	0.9	–	–
BC 147A	0.25	0.1	0.25	50	45	50	–	–	100	35	–	65	–	45	–	–	–	–
				85		–												

Transistor	h_{ie}	h_{oe}	h_{re}	θ_{ja}
2N 525 (PNP)	1.4kΩ	25μmho	2×10^{-4}	0.4°C/mW
BC 147B	4.5kΩ	30μmho	2×10^{-4}	0.4°C/mW
ECN 055	12Ω	–	–	–
2N 3055	6Ω	–	–	–

	I_{bs} max. mA	10	9.0	8.3	7.6	6.8	6.1	5.4	4.2	3.1	2.2	1.6			
					4.6	4.0	3.3	2.7	1.7	0.8	0.2	0.0	0.0	0.0	0.0

	Volts	Volts	Volts									
2N3822	50	50	50	300 mW	175°C	2 mA	3000 μ mho		50 KΩ	2 mW/°C		0.58°C/mW
									50 KΩ	–		

S.E. Electronics Sem IV old 19-5-16

Sub- Digital System Design

QP Code : 546901

(3 Hours) **[Total Marks :100**

N.B. : (1) Question No. **1** is **compulsory.**
(2) Answer any **four** questions from remaining **six** questions.

1. (a) Draw the block diagram of sequential state machine and discus the types : Moore and mealy. **5**
(b) Write a VHDL code for D flipflop **5**
(c) Draw IC 7490 in Mod 10 counter mode. Explain the connections and working. **5**
(d) Draw a 4 bit ring counter using J-K flipflop Also draw the output waveforms. **5**

2. (a) Draw and explain the structure of **10**
(i) Static RAM (ii) Dynamic RAM **10**
(b) Design a 4 bit BCD Counter using T flipflops.

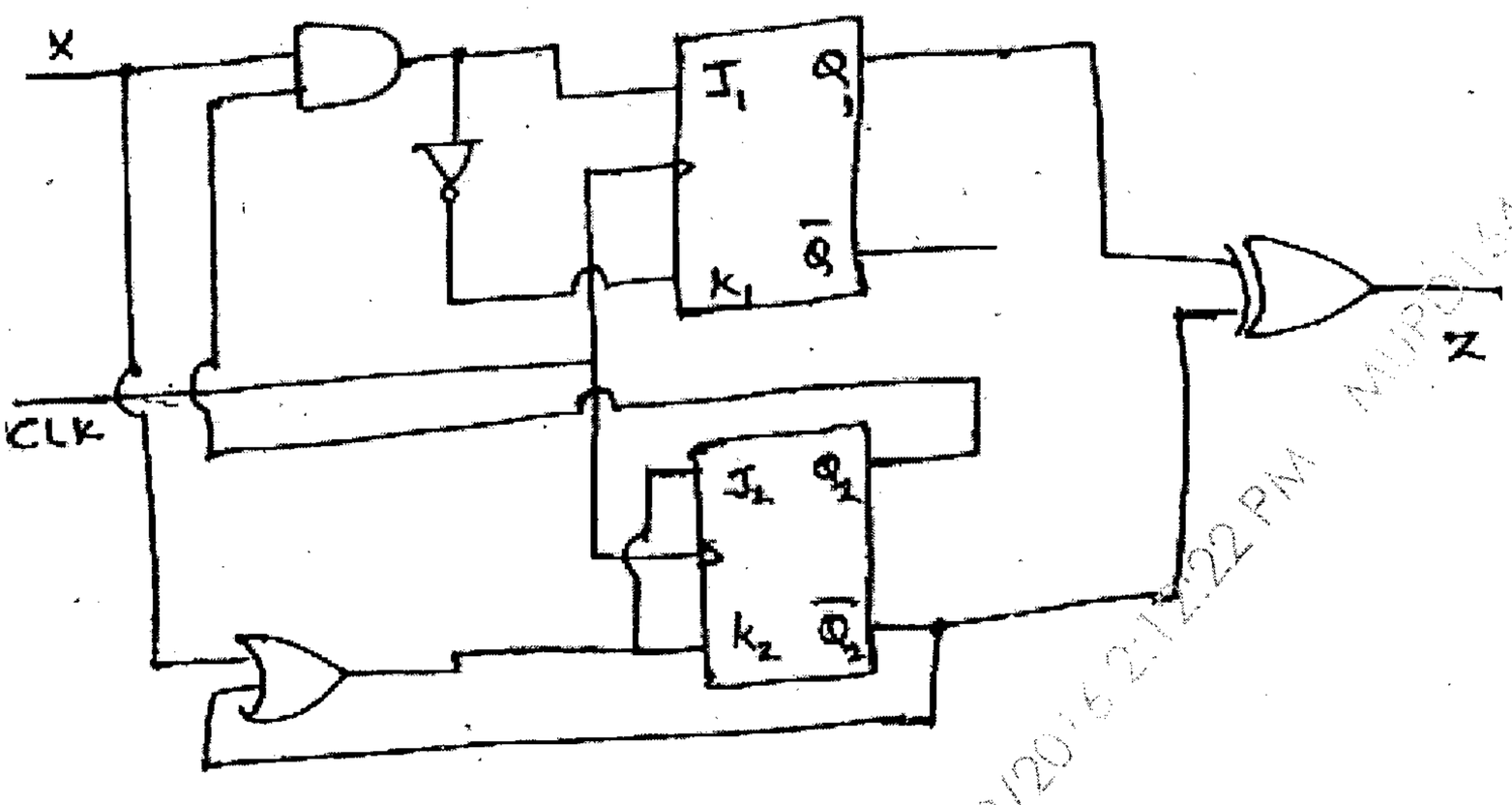
3. (a) Design 8 bit binary counter using suitable counter IC's
(b) Identify the equivalent states and minimize the following state table. Also draw the reduced state diagram. **10**

Present state	Next state		Output
	x=o	x=1	
A	B	F	0
B	C	E	1
C	B	D	0
D	E	A	1
E	A	E	1
F	E	C	0

4. (a) Write a VHDL code for full adder. Declare it as a component. Using this component, write a structural code for 4 bit adder. **10**
(b) Draw a state diagram for 2 bit-bidirectional shift register which has data input 'S'and mode selection input 'M'. **10**
When M=0 ----right shift
When M= 1 ---- left shift
Also write its state transition table.

[TURN OVER]

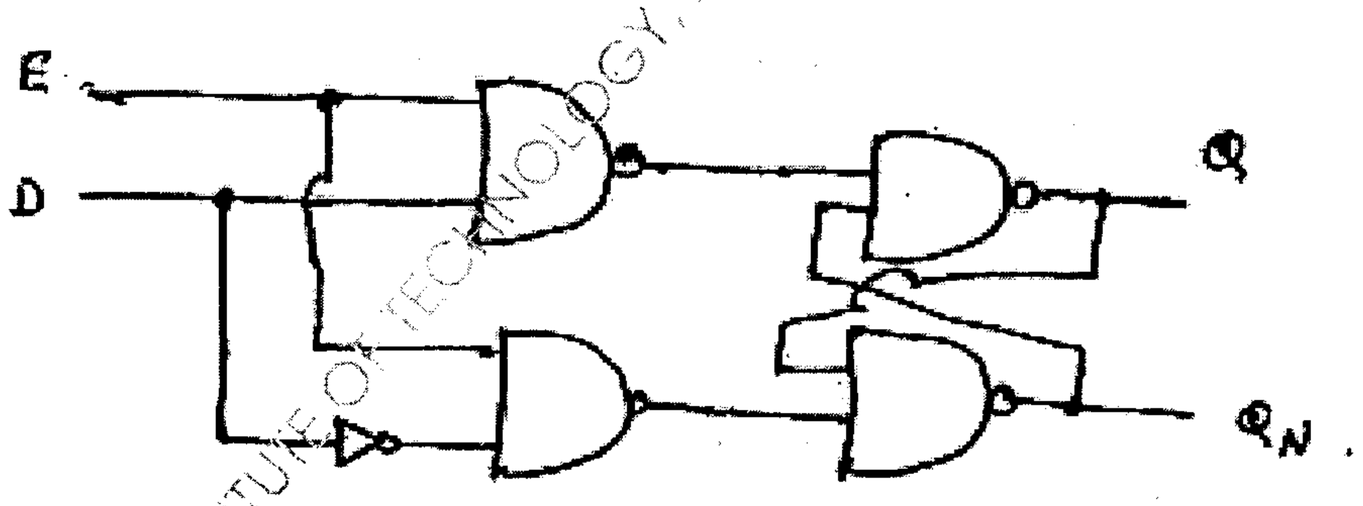
5. (a) Analyse the given sequential state machine **10**
Write :
(i) next state equation
(ii) output equation
(iii) State transition table.
(iv) Draw the state diagram.



(b) Write a note on CPLD X C 9500 architecture. **10**

6. (a) Write a VHDL code for 4 bit binary counter which has active low reset input and Changes the state at -Ve edge of the clock.

6. (b) Analyse the following feedback sequential circuit. **10**



Write output equation, state and output table for the circuit. Indicate the stable states.

20

7. Write short note on any **three** :
(a) Features of VHDL
(b) ROM memory
(c) Universal shift register
(d) I/O block of XC 4000 FPGA.

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sem-IV/old
ETRX/ Advance Engg. math

13/05/16

Q.P. Code : 546801

(3 Hours) **[Total Marks : 100**

OLD COURSE

Note : - 1) Question number 1 is compulsory.

2) Attempt any four questions from the remaining six questions.

3) Figures to the right indicate full marks.

Q. 1 . a) Find the eigen values and eigen vectors for A = $\begin{bmatrix} -1 & 4 \\ 2 & 1 \end{bmatrix}$ 5

b) The probability distribution function of random variable is $f(x) = k(x - x^2)$ $in\ 0 \leq x < 1$

find k, mean and variance. 5

c) Find the residues of $f(x) = \frac{z+1}{(z+4)(z-1)^2}$ 5

d) IF $f(x) = 3x^2 + 1$ wrere f: R →R .Check whether f is surjective function. 5

Q.2 . a) Evaluate $\int_c \frac{z-1}{z^2-4} dz$ where C is i) $|z-2|=1$ ii) $|z+2| = 1$ iii) $|z| = 0.5$. 6

b) If A = $\begin{bmatrix} \frac{\pi}{2} & \pi \\ 0 & \frac{3\pi}{2} \end{bmatrix}$ Find cosA. 6

c) Show that A= $\begin{bmatrix} 8 & -8 & -2 \\ 4 & -3 & -2 \\ 3 & -4 & 1 \end{bmatrix}$ is diagonable. Find the diagonal matrix and the

diagonalising matrix. 8

Q. 3. a) Fit the poisson distribution for the following data 6

x	0	1	2	3	4	5
f	142	156	69	27	5	1

b) If A=$\begin{bmatrix} 1 & 0 \\ 0 & 2 \end{bmatrix}$ Find e^A 6

c) Evaluat $\int_0^{2\pi} \frac{d\theta}{13+5sin\theta}$. 8

[TURN OVER

Q. 4 . a)In a normal distribution 31% items are under 45 and 8% are over 64 . Find the mean standard deviation. 6

b) If $f(x) = 2x^2+3$ and $g(x) = 4x+3$ .Test whether the inverse function for both f and g exist. Also find fog and gof 6

c) Find all possible expansions if $f(z) = \frac{z+1}{z^2+5z+6}$ about z=0 indicating the region of convergence. 8

Q. 5. a) Varify Caley Hamiltons theorem and find A^{-1} for A = $\begin{bmatrix} 5 & -6 & -6 \\ -1 & 4 & 2 \\ 3 & -6 & -4 \end{bmatrix}$ 6

b) Find the mean and varience for binomial distribution. 6

c) Check whether A = { 2,4,12,16} and B = {3,4,12,24} are lattices under divisibility .also draw the Hasse Diagram . 8

Q 6 . a)A random variable X has mean 5 and varience 5 and Y has mean -2 and varience 3 . Find

I) E(2X+3Y) , V(2X+3Y) II) E(3X-4Y+5) , V(3X-4Y+5) 6

b) Show that A = {0,1,2,3,4,5} is a finite abelian group under addition modulo 6. 6

c) A certain drug administered to 12 patients resulting in the following changes in their blood pressure

5,2,8,-1,3,0,6,-2,1,5,0,4

Can we conclude that the drug increases the blood pressure? 8

Q.P. Code : 546801

3

Q .7. a) Is $(Z_6 + *)$ an integral domain? Is it Field? 6

b) Show that $A=\begin{bmatrix} 5 & -6 & -6 \\ -1 & 4 & 2 \\ 3 & -6 & -4 \end{bmatrix}$ is derogatory . 6

c) Can it be concluded that the average life span of an Indian is more than 70 yrs if a random sample of 100 indians has an average life span of 71.8yrs with standard deviation of 7.8 yrs. 8