ETRX

S-E (Sem IV) NOV-DEC 2013 21-1215

Electronic and Electrical Measuring Instruments and Machine

27-10-13-DTP6-AK-1

Con. 5866-13. **LJ-10639**

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

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

(2) Solve any **four** questions out of remainig **six** questions.

(3) Assume any suitable data if necessary and mention that assumption while solving that question.

(4) **Figures** to the **right** inidicate **full** marks

1. (a) Explain the function of delay line in oscilloscope. What are the diferent types of delay lines. **5**

(b) Compare a true rms meter with an average responding meter. **5**

(c) Explain the necessity of damping torque in an indicating instrument. **5**

(d) What is back emf. What is the effect of back emf in a d.c. motor. **5**

2. (a) Explain the digital phase meter using flip-flop. Write its advantages and disadvantages. **10**

(b) Draw the circuit diagram of a schering bridge and derive the condition for balance. Draw phasor daigram. **10**

3. (a) Explain different methods for speed control of D. C. motor. **10**

(b) Draw and explain the front panel of dual trace oscilloscope. **10**

4. (a) What are the requirements of a good laboratory type signal generator. Explain AF signal generator. **10**

(b) Explain the principle of operation of PMMC and moving iron type of instruments. Comparethe two basic types. **10**

5. (a) Explain construction and working of digital frequency meter with the help of neat labelled diagram. **10**

(b) Explain starting methods of Induction motor. **10**

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6. (a) Write a not on - DSO **10**

   (b) Explain R-2R ladder technique used in D to A conversion. **10**

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

   (a) Megger

   (b) FET Voltmeter.

   (c) Maxwell's Inductance bridge.

   (d) Function of CT in CRO.

S.E. (Electronics) (Sem-IV) (Rev.) Examination Nov-Dec, 2013

5/12/13 ECAD

Ash4-D:\Data-20

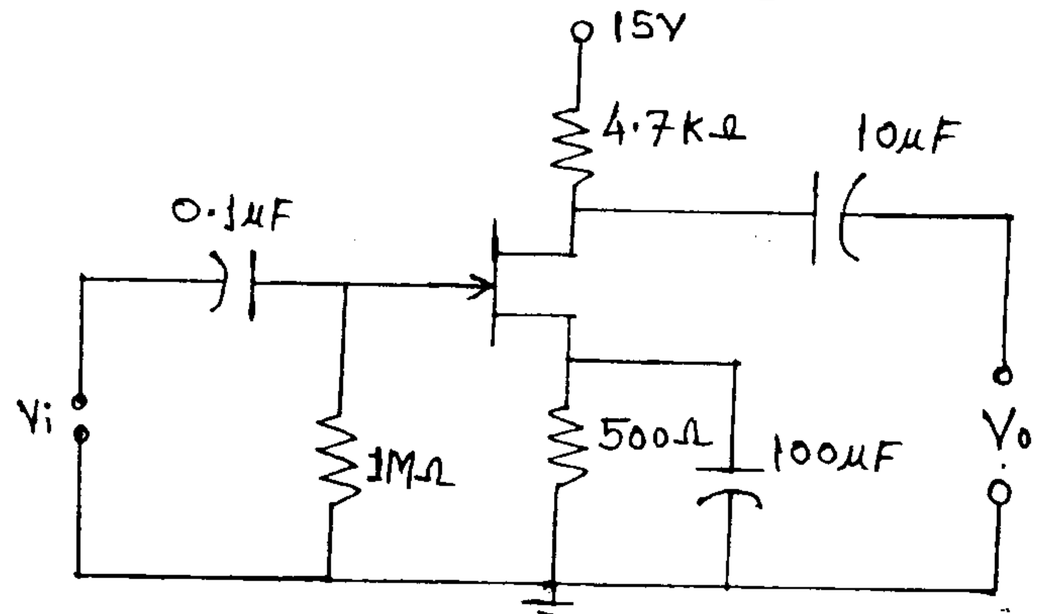
Con. 6463-13. **LJ-10528**

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

N.B. : (1) Question no. **1** is **compulsory**.
(2) Solve any **four** questions from remaining **six** questions.
(3) Assume **suitable** data if it is not mentioned in the problem.

1. Design two stage RC coupled CE amplifier for the given specifications :– **20**
$AV \geq 2000$, $fL = 20Hz$, $S_{ICO} = 9$, $Vo = 3V$, use suitable transistor from the data sheet.

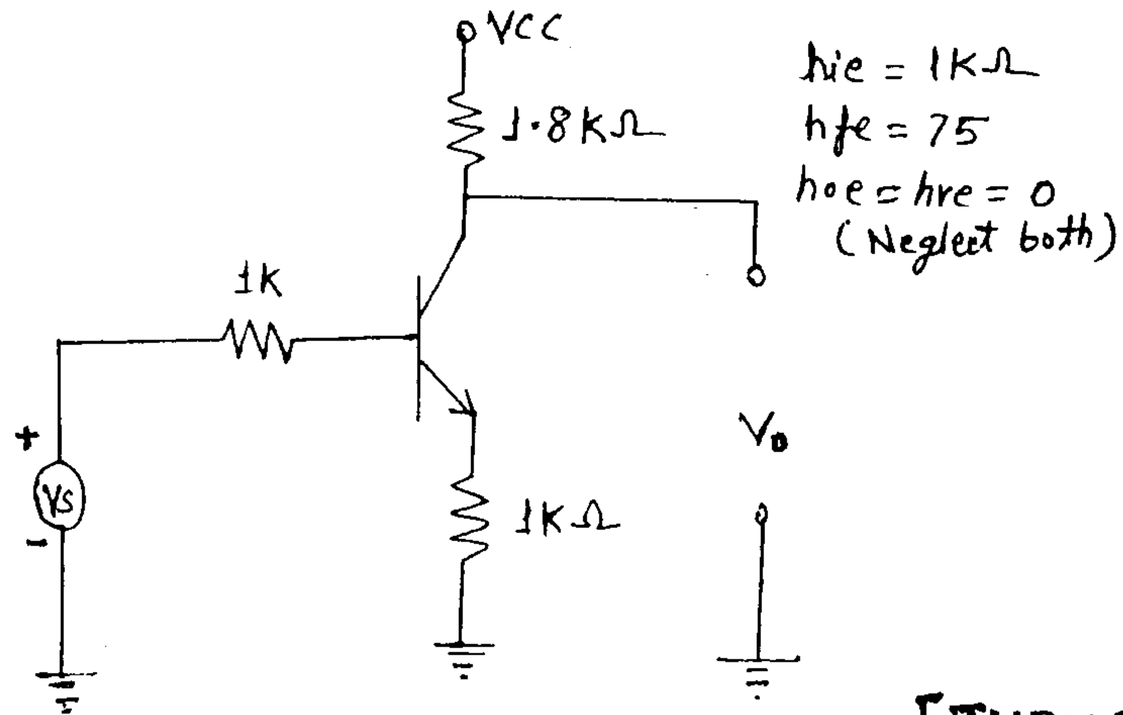
2. (a) Explain the procedure to find lower cut off frequency for CS amplifier and hence find the lower cut off frequency for the given circuit. **10**



(b) Explain wien bridge oscillator and hence derive equation of frequency also state the use of it. **10**

3. (a) Explain High Frequency response of CE Amplifier and state the limitation of CE amplifier. **10**
(b) Design RC phase shift oscillator to generate frequency of 10KHz. **10**

4. (a) Design Class A power amplifier for car music system to give output power of 20w to load of 8Ω . **10**
(b) For the given circuit find Avf, Rif and Rof. **10**



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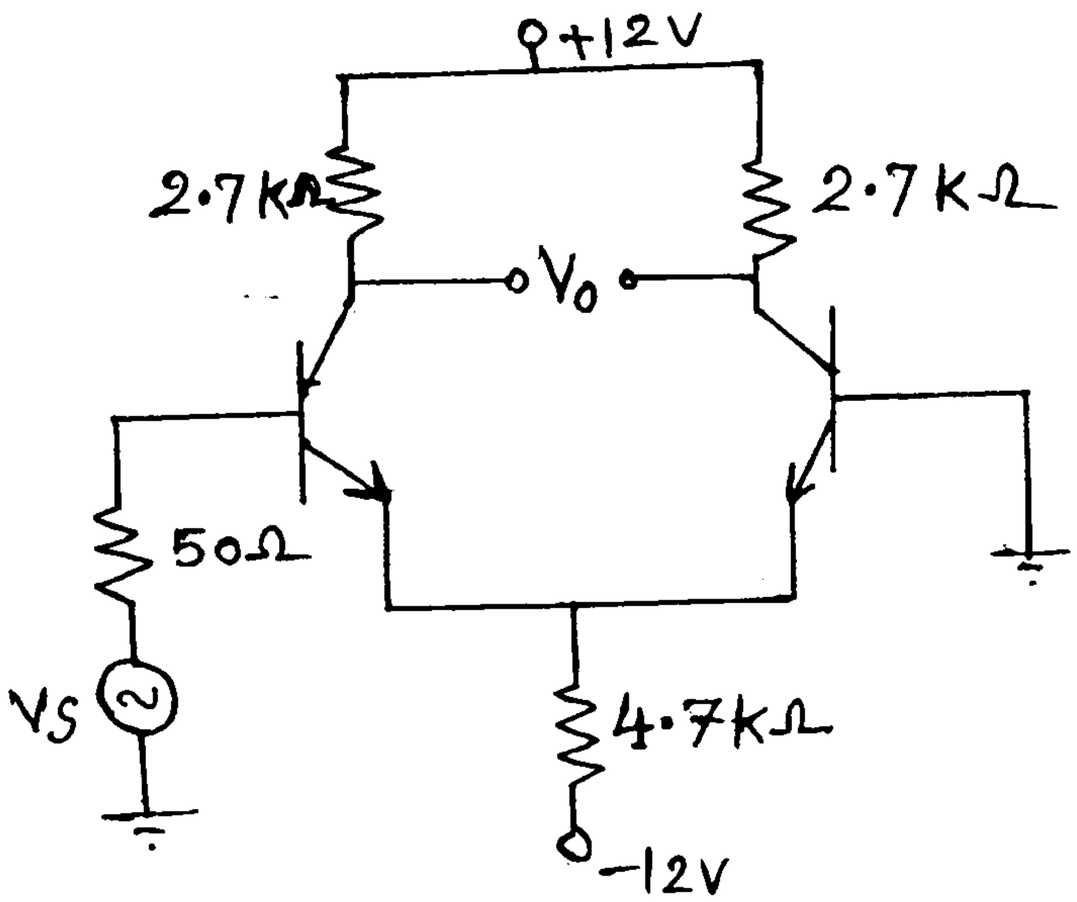
5. (a) For the single input balanced output differential amplifier calculate: **10**

(i) Q point.
(ii) Ad.
(iii) Ri and
(iv) Ro.



Assume $\beta dc = \beta ac = 100$ for both the transistors.

(b) Explain operation of Class B push–pull amplifier and derive equation for power efficiency. **10**

6. (a) Draw block diagram of each type of –ve feedback amplifier with equation of gain, feedback factor, input impedance and output impedance. **10**

(b) Explain any two types of constant current sources that can be used with differential amplifier. **10**

7. Write short notes on any **four** :– **20**

(a) Hartley oscillator.
(b) Class C power Amplifier with applications.
(c) Use of RE^1 in differential amplifier (swamping resistor).
(d) Analysis of voltage shunt feedback amplifier.
(e) Darlington amplifier with applications.

DBEC DATA SHEET

Transistor type	Pdmax @ 25°C Watts	Icmax @ 25°C Amps	$V_{CE}^{(sat)}$ volts d.c.	V_{CBO} volts d.c.	V_{CEO} (Sus) volts d.c.	V_{CER} (Sus) volts d.c.	V_{CEX} volts d.c.	V_{BEO} volts d.c.	T_j max °C	D.C. current gain min.	typ.	max.	Small Signal min.	typ.	h_{fe} max.	V_{BE} max.	θ_{j_c} °C/W	Derate above 25°C W/°C
2N 3055	115·5	15·0	1·1	100	60	70	90	7	200	20	50	70	15	50	120	1·8	1·5	0·7
ECN 055	50·0	5·0	1·0	60	50	55	60	5	200	25	50	100	25	75	125	1·5	3·5	0·4
ECN 149	30·0	4·0	1·0	50	40	—	—	8	150	30	50	110	33	60	115	1·2	4·0	0·3
ECN 100	5·0	0·7	0·6	70	60	65	—	6	200	50	90	280	50	90	280	0·9	35	0·05
BC147A	0·25	0·1	0·25	50	45	50	—	6	125	115	180	220	125	220	260	0·9	—	—
2N 525(PNP)	0·225	0·5	0·25	85	30	—	—	—	100	35	—	65	—	45	—	—	—	—
BC147B	0·25	0·1	0·25	50	45	50	—	6	125	200	290	450	240	330	500	0·9	—	—

Transistor type	hie	hoe	hre	θja
BC 147A	2·7 K Ω	18μ ℧	$1·5 \times 10^{-4}$	0·4°C/mw
2N 525 (PNP)	1·4 K Ω	25μ ℧	$3·2 \times 10^{-4}$	—
BC 147B	4·5 K Ω	30μ ℧	2×10^{-4}	0·4°C/mw
ECN 100	500 Ω	—	—	—
ECN 149	250 Ω	—	—	—
ECN 055	100 Ω	—	—	—
2N 3055	25 Ω	—	—	—

BFW 11—JFET MUTUAL CHARACTERISTICS

–Vgs volts	0·0	0·2	0·4	0·6	0·8	1·0	1·2	1·6	2·0	2·4	2·5	3·0	3·5	4·0
Ids max. mA	10	9·0	8·3	7·6	6·8	6·1	5·4	4·2	3·1	2·2	2·0	1·1	0·5	0·0
Ids typ. mA	7·0	6·0	5·4	4·6	4·0	3·3	2·7	1·7	0·8	0·2	0·0	0·0	0·0	0·0
Ids min. mA	4·0	3·0	2·2	1·6	1·0	0·5	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0

N-Channel *JFET*

Type	V_{DS} max. Volts	V_{DG} max. Volts	V_{GS} max. Volts	P_d max. @25°C	T_j max.	I_{DSS}	g_{fs} (typical)	$-V_p$ Volts	r_d	Derate above 25°C	θ_{j_a}
2N3822	50	50	50	300 mW	175°C	2 mA	3000 μ ℧	6	50 KΩ	2 mW/°C	0·59°C/mW
BFW 11 (typical)	30	30	30	300 mW	200°C	7 mA	5000 μ ℧	2·5	50 KΩ	—	0·59° C/mW

S.E. (ETRX) SEM IV 11/12/13

Basic of Analog and Digital Communication Systems

2nd Half-13(8)-PKL-14

Con. 6476-13. **LJ-10565**

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

N. B. : (1) Question No. **1** is **compulsory**.
(2) Solve any **four** from remaining.
(3) Assume suitable data if necessary.

1. (a) Compare TDM and FDM **20**
(b) State and explain sampling theorem
(c) Explain companding
(d) What is need of modulation.

2. (a) Explain ISB techniques of transmission. **10**
(b) What is need of SSB generation, explain phase shifting method for SSB generation. **10**

3. (a) Explain indirect method of F.M. generation. **10**
(b) Explain sources of noise. **10**

4. (a) Explain superheterodyne radio receiver, what are advantages over TRF. **12**
(b) Explain balance modulator. **8**

5. (a) Explain adaptive delta modulator. **10**
(b) Explain PCM technique. **10**

6. (a) Draw the line coding waveforms for the bit sequence. bit : 11010010 **10**
(i) NRZ
(ii) Bipolar NRZ
(iii) Unipolar
(iv) Polar RZ
(v) Polar NRZ
(b) Explain generation & detection of PWM & PPM. **10**

7. Write short notes on:– **20**
(a) Quantization process
(b) Practical diode detector
(c) Image frequency
(d) Fidelity & doubal spotting of radio receiver.

/ S.E. ETRX Sem IV CBSGS NOV-13 26/11/13

Sub:- AEM.

3 : 2nd half.13-Avi(av)

Con. 9034-13. **LJ-10457**

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

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions from the remaining **six** questions.
(3) **Figures** to the **right** indicates **full** marks.

1(a) A continuous random variable X takes values between 2 and 5. Its density Function is $f(x) = k(1+x)$. Find k and $P(x < 4)$ 5

(b) Prove that the eigen values of a unitary matrix are of unit modulus. 5

(c) Find the sum of residues at singular points of $f(z) = \frac{z}{(z-1)^2(z^2-1)}$ 5

(d) In the set of natural numbers, prove that the relation x R y if and only if $x^2 - 4xy + 3y^2 = 0$ is reflexive, but neither, symmetric nor transitive. 5

2(a) Evaluate $\int_C \frac{4z-1}{z^2-3z-4}\,dz$ where C is the ellipse $x^2 + 4y^2 = 4$ 6

(b) The mean height of a random sample of 100 individuals from a population is 160. The standard deviation of a sample is 10. Would it be reasonable to suppose that the mean height is 165? 6

(c) Show that the following matrix A is similar to diagonal matrix. Find the diagonal form and the diagonalising matrix where, $A = \begin{bmatrix} -17 & 18 & -6 \\ -18 & 19 & -6 \\ -9 & 9 & 2 \end{bmatrix}$ 8

3(a) Find mean and variance of Poisson's Distribution 6

(b) If $A = \begin{bmatrix} \pi & \pi/4 \\ 0 & \pi/2 \end{bmatrix}$ find cosA 6

(c) Evaluate $\int_0^{2\pi} \frac{\cos 2\theta}{5+4\cos\theta}\,d\theta$ 8

4(a) In a large institution 2.28% employees receive income below Rs.4500 and 15.87% employees receive income above Rs.7500. Assuming the income to be normally distributed, find the mean and the standard deviation. 6

(b) If f and g are defined as: $f: R \to R,\ f(x) = 2x-3;\ g: R \to R,\ g(x) = 4-3x.$ 6

(i) Verify that $(f \circ g)^{-1} = g^{-1} \circ f^{-1}$ (ii) Solve $f \circ g(x) = g \circ f(1)$

(c) Find all possible Laurent's expansions of the function 8

$$f(z)=\frac{7z-2}{z(z-2)(z+1)} \text{ about } z=-1$$

5(a) Is (Z_6, +, ×) an integral domain? Is it a field? 6

.(b) Fit a Binomial distribution to the following data. 6

X :	0,	1,	2,	3,	4,	5,	6
f :	5,	18,	28,	12,	7,	6,	4

(c) Let L={1, 2, 3, 6} and R be the relation 'is divisible by'. Prove that L is a lattice. 8

6(a) If $A=\begin{bmatrix}1 & 4\\ 1 & 1\end{bmatrix}$ find A^7-9A^2+I 6

(b) A die was thrown 132 times and the following frequencies were observed 6

No. obtained :	1,	2,	3,	4,	5,	6,	Total
Frequency :	15,	20,	25,	15,	29,	28,	132

Test the hypothesis that the die is unbiased.

(c) Let A={1, 2, 3, 5, 6, 10, 15, 30}and R be the relation 'is divisible by'. 8
Obtain the relation matrix and draw the Hasse diagram.

7(a) The first four moments of a distribution about the value 4 are -1.5, 17, -30 and 108. 6
Calculate the moments about the mean

(b) Prove that the set of cube- roots of unity is a group under multiplication of 6
complex numbers.

(c) The following data relates to the marks obtained by 11 students in two tests, 8
one held at the beginning of the year and the other at the end of the year after giving intensive coaching

Test I :	19	23	16	24	17	18	20	18	21	19	20
Test II :	17	24	20	24	20	22	20	20	18	22	18

Do the data indicate that the students are benefited by coaching?

S.E (ETRx) Sem IV Rev 30/11/13
Digital System Design II

30-10-2013-DTP-P-8-KG-23

Con. 6284 - 13. **LJ-10491**

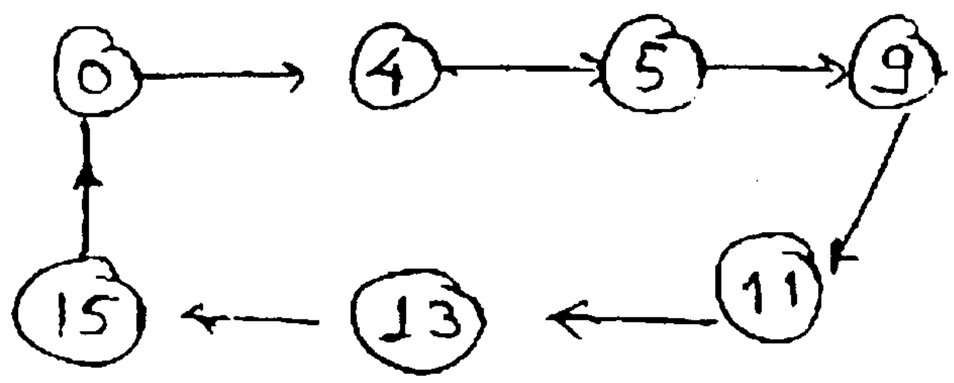
(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. 1 is **compulsory**.
(2) Attempt any **four** out of **remaining six** questions.
(3) **Figures** to **right** indicate **full** marks.

1. (a) Compare SRAM and DRAM. **5**
   (b) Explain basic structure of a VHDL program. **5**
   (c) A sequence 1000 → 0100 → 0010 → 0001 → 1000 is to be generated using universal shift register 74194. Draw the realization diagram. **5**
   (d) Differentiate between fundamental mode & pulse mode sequential asynchronous circuits. **5**

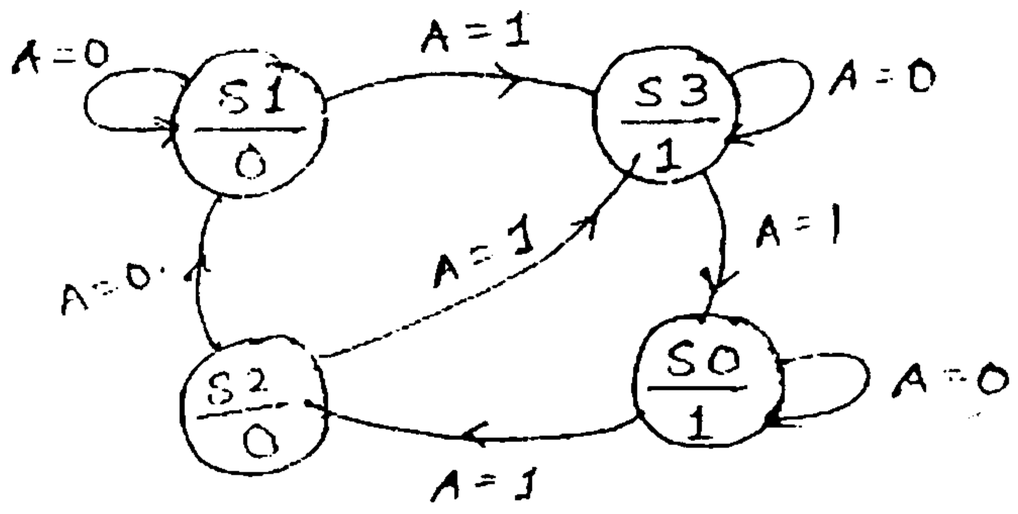
2. (a) Write VHDL code for 8 bit universal shift register. **10**
   (b) Draw two state diagrams of sequence detectors that output '1' when input sequence of 10110 is detected as **10**
      (i) Overlapping sequence Moore Machine.
      (ii) Overlapping sequence Melay Machine.

3. (a) Design a synchronous counter that counts following sequence using J-K flip-flops. **10**



All unused states are driven to the next used state in sequence.
   (b) Discuss CPLD Xillinx 9500 series architecture with neat block diagram. **10**

4. (a) Write a VHDL program (Behavioral model) for a Moore machine described by following state diagram. **10**



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(b) Design and explain working of Mod 90 counter using IC 7490. (Asynchronous decade counter) **10**

5. (a) Eliminate the redundant states from the state table shown below using any state reduction method. Draw the reduced state diagram. (X1X2 - External inputs) **10**

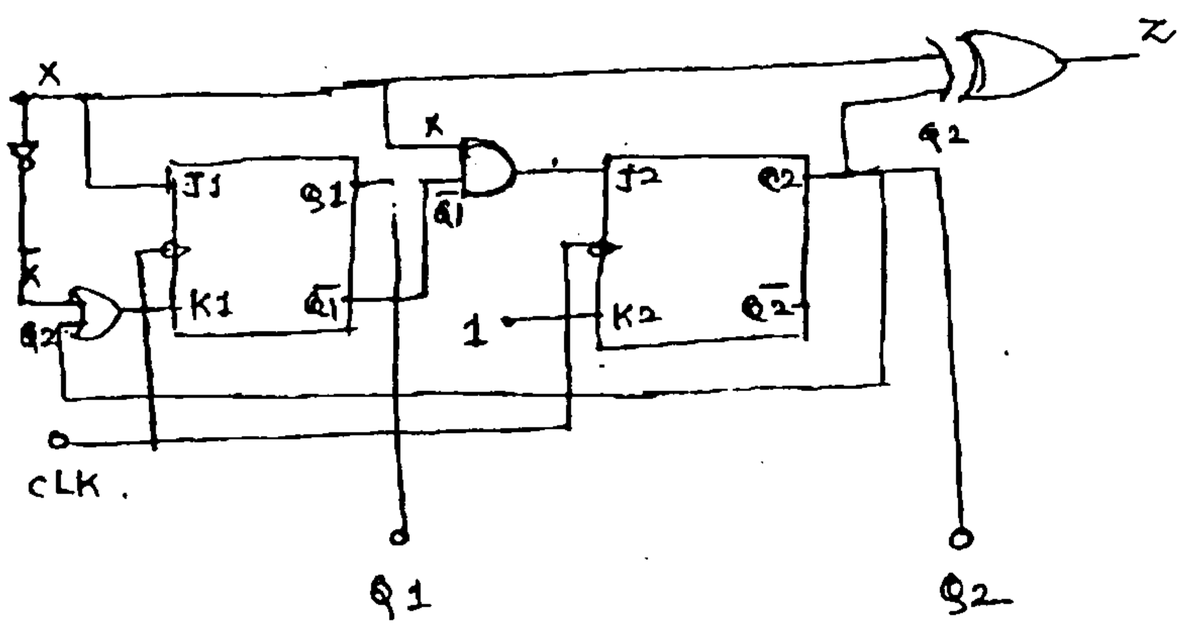
Present State	X1X2 = 00	01	10	11
A	D/0	D/0	F/0	A/0
B	C/1	D/0	E/1	F/0
C	C/1	D/0	E/1	A/0
D	D/0	B/0	A/0	F/0
E	C/1	F/0	E/1	A/0
F	D/0	D/0	A/0	F/0
G	G/0	G/0	A/0	A/0
H	B/1	D/0	E/1	A/0

(Next State / output)

(b) Draw a neat diagram of SRAM cell and explain how read and write operations are carried out. **10**

6. (a) Design a counter that counts from 0 to 255 using suitable synchronous counter IC. **10**

(b) Analyse following sequential circuit and draw state diagram. **10**



7. Write shor **20**

(a) Modelling styles in VHDL.

(b) State assignment rules and it's implication on sequential design.

(c) FPGAXC4000 family.

(d) Implementation of 8:1 mux with active low enable in VHDL.
