

Con. 5213-09.

(REVISED COURSE)

(3 Hours)

[Total Marks : 100

- N.B.** (1) Question No.1 is compulsory.
 (2) Answer any four questions from remaining.
 (3) Assume suitable data wherever necessary.
 (4) Draw neat circuit diagram wherever necessary.

1. (a) Give the comparison between Melay machine and Moore machine. 4
 (b) With neat circuit diagram, explain how the switch bouncing can be avoided using Flip-flop. 4
 (c) What are the differences between FPGAs and CPLDs. 4
 (d) Draw the block diagram of a typical Op-amp and explain the function of each block. 4
 (e) With neat circuit explain how a resistor can be simulated using switch capacitors. 4

2. (a) Design a melay state machine for overlap sequence detector for the string "1101". The output must be '1' when the input matches this string — 2
 (i) Draw the state diagram 4
 (ii) Write its transition and output table 4
 (iii) Draw its logic diagram. 4
 (b) Using equal-components, design a second-order band-pass KRC filter with $f_0 = 2$ KHz and BW = 400 Hz. 8
 What is its resonant gain ? 2

3. (a) Analyse the snchronous state machine shown in Figure 3(a). Draw its state diagram. 5

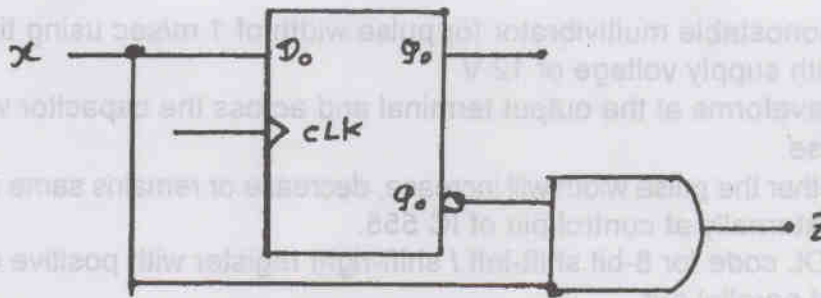
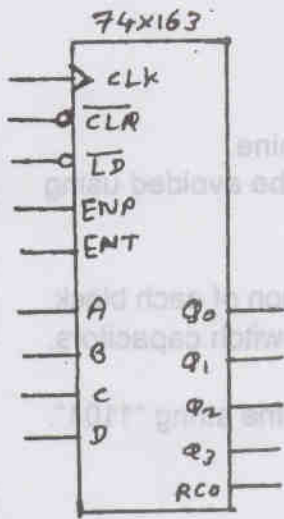


Fig. 3(a)

- (b) Explain how to arrange ROM cells in an array using two dimensional decoding. 5
- (c) Draw the block diagram of IC 810 audio power amplifier. 3
 Explain its operation. 4
 List the features of IC 810. 3

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4. (a) Design a modulo-10 counter with counting sequence 3, 4, 5, ..., 12, 3, using MSI 74 × 163 IC. The pin diagram and the functionality of MSI 74 × 163 is given in Figure 4 (a). 4



Inputs				Current state				Next state			
CLR	LD	ENT	ENP	Q ₃	Q ₂	Q ₁	Q ₀	Q ₃ *	Q ₂ *	Q ₁ *	Q ₀ *
0	X	X	X	X	X	X	X	0	0	0	0
1	0	X	X	X	X	X	X	D	C	B	A
1	1	0	X	X	X	X	X	Q ₃	Q ₂	Q ₁	Q ₀
1	1	X	0	X	X	X	X	Q ₃	Q ₂	Q ₁	Q ₀
1	1	1	1	0	0	0	0	0	0	0	1
1	1	1	1	0	0	0	1	0	0	1	0
		⋮									
1	1	1	1	1	1	1	1	0	0	0	0

Fig. 4(a)

- (b) Explain the operation of sample and hold circuit. 4
 Draw its input and output waveforms. 4
- (c) Draw the block diagram of frequency multiplier using IC 565. 4
 Explain the block diagram of IC 565
5. (a) Design a monostable multivibrator for pulse width of 1 m/sec using timer IC 555 5
 operated with supply voltage of 12 V.
 Draw the waveforms at the output terminal and across the capacitor with respect 3
 to clock pulse.
 Explain whether the pulse width will increase, decrease or remains same if the 8 V dc 2
 is applied externally at control pin of IC 555.
- (b) Write a VHDL code for 8-bit shift-left / shift-right register with positive edge clock, 10
 serial in and parallel out.
6. (a) What is an Instrumentation Amplifier ? 2
 Draw a neat circuit of an Instrumentation amplifier using 3 Op-amps. 3
 Derive its output voltage equation. 5
- (b) Draw the internal structure of a synchronous SRAM. 5
 Explain the operation of SRAM. 5
7. (a) Draw a neat circuit of Non-inverting Schmitt Trigger. 3
 Draw its output and input waveforms. 2
- (b) Draw a neat circuit for voltage to current converter with grounded load. 2
 Derive its output current expression. 3
- (c) Give the features of IC 566 VCO. 5
- (d) Explain the various documentation standards of sequential circuits. 5