DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
B.TECH - IT - Semester - III
SUBJECT: (IT 301) Design of Digital Circuits

Examination	**: Third Sessional**	**Seat No.**	**:**
Date	**: 15/10/2016**	**Day**	**: Saturday**
Time	**: 11:00 to 12:15**	**Max. Marks**	**: 36**

INSTRUCTIONS:
1. Figures to the right indicate maximum marks for that question.
2. The symbols used carry their usual meanings.
3. Assume suitable data, if required & mention them clearly.
4. Draw neat sketches wherever necessary.

Q.1 Do as directed. **[12]**

(a) Convert S-R flip-flop to J-K flip-flop. **[2]**

(b) What are decade counters? Show block diagram of BCD counter which counts 0 to 9999. **[2]**

(c) "Asynchronous counters are faster than synchronous counters". State T/F with justification. **[1]**

(d) Why Flip Flop is called a single-bit register? **[1]**

(e) Construct a mod 11-counter using MSI circuit. Give two alternatives. **[3]**

(f) Design a 3-bit Ripple counter using D Flip-flop. **[3]**

Q.2 Attempt following questions. **[12]**

(a) Reduce the state of state table given in **Table-1** below. Also provide the binary state assignment to reduce states. **[6]**

(b) Design a Johnson counter with attached AND gates require for outputs to generate 12 timing signals. **[6]**

OR

(b) Design a circuit which generates Timing signals (8-timing sequence) for parallel mode of operation. Also represent the sequence of 8 timing signals. **[6]**

Q.3 Attempt following questions **[12]**

(a) Using MSI of 4-bit counter with parallel load, construct a binary counter that counts from 0 to binary 64. **[2]**

(b) Design a serial adder using sequential logic procedure.(use T Flip-flop) **[4]**

(c) Design a sequential circuit whose state diagram is shown in **Figure-A** below. The type of flip-flop to be use is RS. **[6]**

OR

Q.3 Attempt following questions **[12]**

(a) Obtain characteristic Table and Excitation table of RS flip-flop. **[2]**

(b) Draw and explain basic memory cell used in Random Access Memory. **[4]**

(c) Design a counter with the following binary sequence: 0,3,4,2,7 and repeat. Use JK flip-flops. **[6]**

Present State	Next State		Output	
	X=0	X=1	X=0	X=1
A	B	C	0	0
B	D	E	0	0
C	F	G	0	0
D	H	I	0	0
E	J	K	0	0
F	L	M	0	0
G	N	P	0	0
H	A	A	0	0
I	A	A	0	0
J	A	A	0	1
K	A	A	0	0
L	A	A	0	1
M	A	A	0	0
N	A	A	0	0
P	A	A	0	0

Table - 1

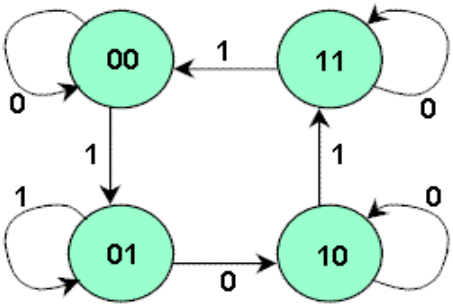

Figure-A