Name :	
Roll No. :	An Annual Of Receiving and Excellent

Invigilator's Signature :

CS/B.TECH (ECE-OLD)/SEM-4/EC-402/2012 2012 DIGITAL ELECTRONICS CIRCUITS

Time Allotted : 3 Hours

Full Marks: 70

The figures in the margin indicate full marks. Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following :

 $10 \times 1 = 10$

i) Decimal number + 52 and - 52 are

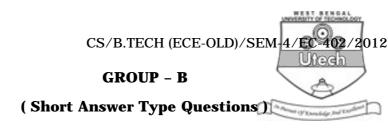
- a) 0110100 & 1110100 b) 0101011 & 1101011
- c) 0110100 & 1101011 d) none of these.
- ii) Addition of two hexadecimal numbers 58 and 24 is
 - a) 7E b) 7C
 - c) 6B d) F1.
- iii) 2's complement of hexadecimal number 73A is
 - a) 9C5 b) 8C6
 - c) 8B7 d) 8F1.

4103 (O)

[Turn over

CS/B.TEC	H (EC	CE-OLD)/SEM-4/E0	C-402/2012		
iv)	Nori	mally in HA circ	uit which	gate	is used for sum
	part	?			A Annual (1/ Exercision 2nd Exercision
	a)	XOR	b)	NANI	
	c)	OR	d)	AND.	
v)	Which one is the invalid code in Excess-3 code ?				ss-3 code ?
	a)	0001 & 0000	b)	0110	& 0100
	c)	1010 & 1100	d)	None	e of these.
vi)	If a 3-input NOR gate has eight input possibilities, how many of those possibilities will result in a high output ?				
	a)	1	b)	2	
	c)	7	d)	8.	
vii)	Which one of the following is reflected code ?				
	a)	8421	b)	Gray	
•••	c)	Excess-3	d)	ASCI	
V111)) If (212) $_x =$ (23) $_{10}$ then what is the value of x?				
	a)	2	b)	3	
	c)	4	d)		
ix)	Which of the following codes is used in <i>K</i> -map for representing the minterm ?				
	a)	BCD	b)	Gray	
	a) c)	8421	d)	Exce	
x)	The example of a Moore machine is				
A)	a)	Sequence detect			ry counter
	c)	BCD counter	d)		DOWN counter.
xi)	,		,		5 counter followed
	by a MOD-8 counter. The output frequency will be				
	a)	10 kHz	b)	2.5 k	Hz
	c)	5 kHz	d)	25 kl	Hz.
xii)	xii) A number of address lines in EPROM 4096×8 is				4096 × 8 is
	a)	2	b)	4	
	c)	8	d)	12.	
4100 (0)			0		

4103 (O)



Answer any *three* of the following. $3 \times 5 = 15$

- 2. Design a 2 bit comparator using logic gates.
- 3. Design a BCD adder circuit to add two BCD numbers maximum. The output of the adder should also be in BCD.
- 4. Minimize the following expressions using *K* map :

 $F(A, B, C, D) = \pi M(0, 7, 8, 9, 10, 11, 15) + \phi(1, 4)$

5. Implement the function using only one 8 : 1 max. Connect BCD with selection line.

 $F(A, B, C, D) = \sum m(0, 1, 2, 5, 9, 11, 13, 15)$

6. What is 'race around problem' ? How can it be overcome in JK flip-flop ?

GROUP - C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

- 7. a) Simplify the following functions by means of *K*-map : i) $F = \sum_{m} (0, 2, 6, 10, 11, 12, 13) + \sum_{d} (3, 5, 14)$. ii) $F = \prod_{M} (0, 2, 6, 10, 11, 12, 13)$. $\sum_{d} (6, 8, 10, 14)$.
 - b) Design a common adder-subtractor and explain its function. 5+5+5
- 8. a) Write down the present state-next state table of JK & D flip-flops and derive the characteristic equation for these two flip-flops.
 - b) Draw logic diagram of the master-slave flip-flop. Why is it called so ?
 - c) What are the differences between edge triggered and level triggered flip-flop. (3 + 3) + 5 + 4

4103 (O)

[Turn over



- 9. a) Describe the operation of successive approximation type ADC. How many clock pulses are required in worst case for each conversion cycle of an 8-bit SAR type ADC ?
 - b) Draw a neat diagram for an R-2R ladder type DAC and explain its operation. 7 + 8
- 10. a) Draw the circuit for a 4-bit Johnson counter using *D* flip-flop and explain its operation. Draw its timing diagram. How does its timing diagram differ from that of Ring counter ?
 - b) Design a MOD-6 synchronous up-counter using JK flipflop. 8 + 7
- 11. Write short notes on any *three* of the following : 3×5
 - a) EEPROM
 - b) CMOS logic
 - c) PLD
 - d) Even parity generator & checker
 - e) Comparator.