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CS/BCA/SEM-1/BCA-101/2012-13

2012 DIGITAL ELECTRONICS

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)

 $10 \times 1 = 10$

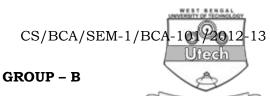
- The Boolean equation of AND operation is i) $Y = \overline{A}$ a) b) Y = ABc) Y = A + BNone of these. d) The logical expression $Y = A + \overline{A}B$ is equivalent to ii) b) $Y = \overline{A}B$ Y = ABa) $Y = A + \overline{B}$ d) Y = A + B.
 - iii) The BCD equivalent of 57 is
 - a) 111001
- b) 01010111
- c) 101111
- d) 10001010.
- iv) In the BCD code, the decimal number 123 is written as
 - a) 11011

- b) C3
- c) 001010011
- d) 000100100011.

1007 Turn over

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v)		carry look-ahead add	er is	s frequently used for			
	a)	is faster	b)	is more accurate			
	c)	uses fewer gates	d)	costs less.			
vi)	ri) A combinational circuit is one in which the or depends on the						
	a) input combination at a time						
	b) previous output and input combination						
	c) previous input and input combination at a timed) present output and previous output.						
vii)	Each individual term in standard SOP form is called as						
	a)	Maxterm	b)	Minterm			
	c)	Midterm	d)	None of these.			
viii)	A decoder with 64 output lines has data inputs.						
	a)	64	b)	1			
	c)	6	d)	None of these.			
ix)	The number of flip-flops required to build a Mod- counter is						
	a)	4	b)	5			
	c)	6	d)	7.			
x)	The full form of CCD is						
	a)	Charged-couple disk	b)	Charge-coupled device			
	c)	Cache coupled device	d)	None of these.			



(Short Answer Type Questions)

Answer any *three* of the following.

- $3 \times 5 = 15$
- 2. Draw a full adder circuit as combination of 2 half adders.
- 3. State Demorgan's law and prove it for 2 variables.
- 4. a) Evaluate $(7352)_{10}$ $(9456)_{10}$ using 9's compliment.
 - b) State Duality principle.
- 5. Minimize the following Boolean expression using K-map. $F(A,B,C,D) = \sum (0,1,3,6,8,10,11,13,15)$
- 6. Design a 4 bit parallel-in parallel-out (PIPO) shift register.

GROUP - C

(Long Answer Type Questions)

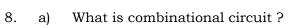
Answer any three of the following.

- $3 \times 15 = 45$
- 7. a) Represent the decimal number 45 in
 - i) Hexadecimal code
 - ii) Gray code
 - iii) BCD code.
 - b) Which gates are called universal gates and why?
 - c) Design a 2 × 4 decoder. Give truth table and draw circuit diagram using basic gates.
 - d) Implement the expression using a Multiplexer.

$$F(A,B,C,D) = \sum (0,1,4,5,7,9,11,13,15)$$

3 + 5 + 4 + 3

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- b) Differentiate between combinational and sequential circuit.
- c) Explain the functionality of clocked JK flip-flop. Give truth table and diagram.

d) Convert SR to JK flip-flop.

$$2 + 3 + 5 + 5$$

- 9. a) What is register?
 - b) Design a decimal to binary encoder.

c) What do you mean by Johnson counter?

$$3 + 6 + 6$$

10. a) Given the following truth table.

X	Y	Z	F
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	0

Obtain the SOP and POS form and draw the circuit diagram.

- b) Express the following Boolean expressions:
 - i) f = AB + A'C in POS form.
 - ii) f = (A + BC)(B + C' A) in SOP form.

8 + 7

- 11. a) What is the difference between synchronous and asynchronous counter?
 - b) Write short notes on the following:
 - i) EPROM
 - ii) DRAM.
 - c) What is the difference between SRAM and DRAM?

4 + 6 + 5

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