



Name :
Roll No. :
Invigilator's Signature :

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)

1. Choose the correct alternatives of the following :

10 × 1 = 10

- i) The Boolean equation of AND operation is
 - a) $Y = \bar{A}$
 - b) $Y = AB$
 - c) $Y = A + B$
 - d) None of these.
- ii) The logical expression $Y = A + \bar{A}B$ is equivalent to
 - a) $Y = AB$
 - b) $Y = \bar{A}B$
 - c) $Y = A + \bar{B}$
 - 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.



- v) A carry look-ahead adder is frequently used for addition, because it
- a) is faster
 - b) is more accurate
 - c) uses fewer gates
 - d) costs less.
- vi) A combinational circuit is one in which the output depends on the
- a) input combination at a time
 - b) previous output and input combination
 - c) previous input and input combination at a time
 - d) 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-15 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.



GROUP – B

(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.
 $F(A,B,C,D) = \Sigma(0,1,3,6,8,10,11,13,15)$
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.

$$F(A,B,C,D) = \Sigma (0,1,4,5,7,9,11,13,15) \quad 3 + 5 + 4 + 3$$



8. a) What is combinational circuit ?
 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