2008-09

Time : 3 hours

Full Marks : 80

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Answer from both the Groups as directed.

Group – A
(Compulsory)

Answer all questions : $2 \times 10 = 20$

1. Select the correct answer of the following :
   (a) The number of flip flops required in a decade counter is :
       (i) 4
       (ii) 5
       (iii) 6
       (iv) 8

   (b) Find the Boolean function of $xz + xyz$ algebraically :
       (i) $z(x + y)$
       (ii) $y(x + z)$
       (iii) $x(y + z)$
       (iv) $z$

EL – 11/1 (Turn over)
(c) What is the form of the Boolean expressions of $AB + BC$?
   (i) Product-of-sums (ii) Sum-of-products
   (iii) K-map (iv) Matrix

(d) Half subtractor is also known as:
   (i) OR gate (ii) EX-OR gate
   (iii) AND gate (iv) NAND gate

(e) A demultiplexer is also known as:
   (i) Encoder (ii) Multiplexer
   (iii) Decoder (iv) Data selector

(f) What is the largest number of data inputs which a data selector with two control inputs can have?
   (i) 2 (ii) 4
   (iii) 8 (iv) 16

(g) The Binary subtractor ($0 - 1$) equals:
   (i) 0 with borrow (ii) 1 with no borrow
   (iii) 0 with no borrow (iv) 1 with borrow

(h) Which memory is non-volatile and may be written only once?
   (i) RAM (ii) EPROM
   (iii) PROM (iv) EE-ROM
(i) An S-R flip-flop cannot accept the following input entry:
   (i) Both inputs zero
   (ii) Zero at R and one at S
   (iii) One at R and zero at S
   (iv) Both inputs one

(j) A simple flip-flop:
   (i) Both inputs zero
   (ii) Zero at R and one at S
   (iii) Zero at S and one at R
   (iv) Both inputs one

**Group – B**

Answer any **four** questions.

2. Minimize the following functions and realize using minimum number of gates: 15
   (a) \( F_1 = \Sigma m(3, 7, 11, 15) \)
   (b) \( F_2 = \Sigma M(0, 5, 6, 7, 10, 11) \)

3. What is Register? Explain 4-bit shift register. 15

4. What is RAM? Design a circuit for RAM. 15

EL – 11/1  (3)  (Turn over)
5. Explain the following:
   (a) DMA
   (b) Half Adder
   (c) Flip-flop
   (d) Flash Memory

6. What is synchronous and asynchronous counter?
   What is Virtual memory?  

7. What is the purpose of the main memory in a computer? What is non-volatile memory?  

8. Explain the different types of memory used in computer.  

9. What is control memory? What is hardwired control unit? Explain RISC and SISC.  

10. Describe the operation of NAND, NOR, EX-OR and EX-NOR with truth table and its symbols.  

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EL – 11/1 (400)  (4)  Comp/II/07/09 — VIli