

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

- (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) $F1 = \Sigma m(3, 7, 11, 15)$
 - (b) $F2 = \Sigma M(0, 5, 6, 7, 10, 11)$
3. What is Register ? Explain 4-bit shift register. 15
4. What is RAM ? Design a circuit for RAM. 15

5. Explain the following : 15
- (a) DMA
 - (b) Half Adder
 - (c) Flip-flop
 - (d) Flash Memory
6. What is synchronous and asynchronous counter ? What is Virtual memory ? 15
7. What is the purpose of the main memory in a computer ? What is non-volatile memory ? 15
8. Explain the different types of memory used in computer. 15
9. What is control memory ? What is hardwired control unit ? Explain RISC and SISC. 15
10. Describe the operation of NAND, NOR, EX-OR and EX-NOR with truth table and its symbols. 15

