NEW

2017

BCA 1st Semester Examination

DIGITAL ELECTRONICS

PAPER—1104

Full Marks : 70

Time : 3 Hours

The figures in the right-hand margin indicate full marks.

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

Illustrate the answers wherever necessary.

Answer Q. No. *1* and any *four* from the rest.

1. Answer any *five* questions : 5×2

(a) Compare EEPROM and flash memory.

(b) Simplify the following Boolean expression into one literal
$W' \times (Z' + YZ) + X(W+YZ)$.

(c) State De-Morgan's theorem.

(d) What is edge triggered flip-flop ?

(e) Define latch.

(f) List out various applications of multiplexer.

(g) What is synchronous sequential circuit ?

2. (a) Simplify the following expression using k-map method $Y = \Sigma m(7, 9, 10, 11, 12)$.

(b) Implement AND logic using NAND gate.

(c) Convert $(78)_{10}$ to its binary equivalent.

(d) What is tri-state logic ? 6+3+3+3

3. (a) Why complement is needed in computer system ?

(b) Perform : $(53)_{10} - (50)_{10}$ using 2's complement.

(c) State the difference between Fan-in and Fan-out.

(d) Draw a half-adder circuit and describe its operations. 3+3+3+6

4. (a) Represent the decimal number "27" in

(i) BCD code

(ii) Octal code

(iii) Gray code.

(b) Draw the block diagram of a digital multiplexer and explain its function.

(c) Give the functional truth table of a 4 : 1 multiplexer and realize it using basic gates AND, OR and NOT.

(d) Implement the expression using a multiplexer $f(A, B, C, D) = \Sigma m(0, 2, 3, 6, 8, 9, 12, 14)$.

3+4+4+4

5. (a) Discuss about the design of an odd parity generator.

(b) What do you mean by race condition in flip-flop ?

(c) Express the function $Y = A + \overline{B}C$ is a canonical SOP form.

(d) What is decoder ? Give a block diagram.

5+3+4+3

6. (a) Implement the Boolean function $F = (A, B, C, D) = \Sigma m(0, 1, 3, 8, 9, 15)$ using two 4-to-1 multiplexer and one OR gate.

(b) Explain with necessary diagram a BCD to 7 segment display decoder.

(c) What is overflow ? Give an example. 6+6+3

7. Write short note of the following (any *three*) : 3×5

(a) Universal gates ;

(b) Decoder ;

(c) Shift Register ;

(d) Ripple counter ;

(e) Demultiplexer.