2023

COMPUTER SCIENCE — GENERAL

Paper : GE/CC-1

(Computer Fundamentals and Digital Logic Design)

Full Marks : 50

The figures in the margin indicate full marks.

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

Answer ***question no.*** **1** and ***any four*** questions from the rest.

1. Answer ***any five*** questions : 2×5

   (a) Define Data and Information.

   (b) Write names of any four system software.

   (c) What is line editor?

   (d) Explain the concept of parallel machines.

   (e) Convert $(ABC)_{16}$ and $(678)_8$ to binary.

   (f) What is a flip flop? Name two flip flops other than SR flip flop.

   (g) State De Morgan's Theorem for two variables.

   (h) Write the function of multiplexer.

2. (a) Write notes on Generations of Computers.

   (b) State the differences between high level languages and low level languages.

   (c) What is a pseudocode? 5+3+2

3. (a) Simplify the following Boolean function using Karnaugh Map and draw logic circuit of the simplified function :

$$F(A,B,C,D) = \sum (1,3,5,7,8,9,10,11)$$

   (b) Explain with example the main symbols used for drawing a flowchart. (3+2)+5

4. (a) Find the following :

   (i) 2's complement of $(11010011)_2$

   (ii) 9's complement of $(1234)_{10}$.

   (b) What are the Error Detecting Codes? Give two examples.

   (c) Write truth table of a full adder and draw its logic diagram. (2+2)+3+3

8. (a) Define universal gate. Prove that NOR is a universal gate.

(b) State the differences between combinational and sequential circuits, giving example of each.

(c) What is a comparator? (1+3)+4+2

6. (a) Given a SR flip-flop, perform the following :

(i) Draw its logic diagram.

(ii) Draw its truth table.

(iii) Draw its excitation table.

(iv) Write its characteristic equation.

(b) Why is cache memory used? (2+2+2+2)+2

7. (a) What is a decoder? Draw truth table and logic diagram of a 3-to-8 decoder.

(b) Draw logic circuit of a right shift register and explain its operation. (2+4)+4

8. Write short notes on ***any two*** of the following : 5×2

(a) Computer virus and protection from virus

(b) Language Translators

(c) Alphanumeric Codes

(d) Asynchronous Counters.