TKN/KS/16/6001

Bachelor of Science (B.Sc.) I.T. Semester—II (C.B.S.) Examination

FUNDAMENTALS OF DIGITAL ELECTRONICS

Paper—I

Time : Three Hours] [Maximum Marks : 50

N.B. :— (1) **ALL** questions are compulsory and carry equal marks.

(2) Draw neat and labelled diagrams wherever necessary.

EITHER

1. (a) What is binary code ? Explain ASCII, EBCDIC and UNICODE. 5

(b) What is gray code ? Explain it with suitable example :

(i) 11001

(ii) 111011. 5

OR

(c) Explain various methods to represent negative numbers in binary number system with suitable example. 5

(d) Do as directed :

(i) $(277)_8 = (\ )_2$

(ii) $(A23)_{16} = (\ )_{10}$. 5

EITHER

2. (a) Construct various gates using NOR gate. 5

(b) Minimise the following expression using K-MAP and draw reduce circuit diagram using logic gates :

$Y = \Sigma m(0, 1, 2, 4, 6, 7, 9, 10, 14)$. 5

OR

(c) State the various Boolean laws and prove the associative laws and commutative laws. 5

(d) Simplify the given equation using K-map and draw its logic diagram :

$$y = \left(\overline{A}\,\overline{B} + \overline{A}C + \overline{B}\,\overline{C} + \overline{A}\,\overline{B}\,\overline{C}\right).$$ 5

EITHER

3. (a) Draw a full adder circuit and explain its working. 5

(b) Explain the working of 8 : 1 multiplexer circuit with basic gates. 5

OR

(c) Draw the logic diagram of clocked JK Flip-Flop and explain its working. 5

(d) Draw the circuit diagram of 4-bit binary ripple counter and explain its working. 5

EITHER

4. (a) Give the classification of semiconductor memory. Explain, how data can be stored in static RAM and dynamic RAM ? 5

(b) Explain the operations of cache memory. 5

OR

(c) Compare semiconductor and magnetic memories. Describe hard disk in detail. 5

(d) Explain the method of expanding memory size with suitable example. 5

5. (a) What is hamming code ? Explain with example. Give one application of it. 2½

(b) State and prove DeMorgans Theorem. 2½

(c) What are JK Flip-Flop and S-R Flip-Flop ? Give advantages of JK Flip-Flop over S-R Flip-Flop. 2½

(d) What is semiconductor memory ? Why is it used as primary memory ? Explain. 2½