Bachelor of Science (B.Sc.I.T.) Semester—II 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 a well labelled diagram wherever necessary.

EITHER

1. (a) What is a number system ? Explain how positive and negative numbers are represented in binary number system with examples. 5

(b) Do as directed :

(i) $(1FA3.30)_{16} = (\ ?\ )_2$

(ii) $(10101011.1011)_2 = (\ ?\ )_8$. 5

OR

(c) What is grey code ? Explain the method of converting binary number into grey code with suitable examples. 5

(d) What is parity code ? What are its types ? Explain how it is useful in error finding ? 5

EITHER

2. (a) Explain the construction and working of Ex-OR gate using basic gates. How does it differ from OR gate ? 5

(b) Construct the following gates using NAND gate exclusively :

(i) NOT gate

(ii) NOR gate

(iii) AND gate. 5

OR

(c) State and prove De-Morgan's theorem for three variables using Truth table. 5

(d) What is K-map ? Simplify the following expression using K-map :

$f(A, B, C) = \Sigma m(0, 1, 4, 6, 7) + \Sigma d(2, 5)$ 5

EITHER

3. (a) What is adder circuit ? Explain the construction and working of half adder circuit using gates. 5

(b) What is decoder ? Explain the construction and working of 2 : 4 decoder using gates. Give any one application of decoder circuit. 5

OR

(c) What is Flip-Flop ? Explain construction and working of D-FF using logic gates. 5

(d) What is asynchronous counter ? Explain the construction and working of 3 bit ripple counter with truth table. 5

EITHER

4. (a) What is memory ? Differentiate between RAM and ROM. 5

(b) What is hard disk ? Explain its construction and working with suitable diagram. 5

OR

(c) Write a short note on Cache memory. 5

(d) What is I/O device ? Explain any one I/O device in brief. 5

5. Attempt **all** :

(a) Write a short note on ASCII Code. 2½

(b) Explain the following terms related to K-map :

(i) SOP

(ii) POS 2½

(c) What is preset and clear terminals in Flip-Flop ? What are their use in circuit ? 2½

(d) Explain the concept of capacity of memory with suitable example. 2½