NRJ/KW/17/3269

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 neat and labelled diagrams wherever necessary.

EITHER

1. (a) What is data ? Explain signed magnitude and unsigned magnitude number with suitable example. 5

(b) What is excess-3 code ? What are its advantages ? Perform the following addition using excess-3 code : 39 + 45. 5

OR

(c) Do as directed :

(i) $(1F38)_{16} = (?)_2$

(ii) $(734)_8 = (?)_{10}$. 5

(d) What is 1's compliment and 2's compliment of a number ? Explain with example. Perform the following subtraction using 2's compliment method :

$(101011)_2 - (1110)_2$. 5

EITHER

2. (a) Why is NAND gate called Universal gate ? Explain in detail. 5

(b) What is Ex-OR gate ? Explain the construction and working Ex-OR gates with basic gates. Give the symbol of Ex-OR gate also. 5

OR

(c) State and prove the following laws :

(i) Associative law

(ii) Commutative law. 5

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

$$Y = A\,B\,\overline{C} + A\,\overline{B}\,C + A\,B\,C + \overline{A}\,\overline{B}\,C$$

Draw the logic circuit for simplified expression. 5

EITHER

3. (a) What is multiplexer ? Design a 8 : 1 MUX using two 4 : 1 MUX. Give its truth table also. 5

(b) What is half adder ? Explain the construction and working of half adder using logic gates. How many half adders are required to add 4 bits simultaneously. 5

OR

(c) What is D-flip-flop ? Explain its construction and working with NAND gates. Why is it called D-latch ? Explain. 5

(d) Explain the construction and working of 4 bit SISO type shift register with its timing diagram. 5

EITHER

4. (a) Differentiate between sequential access and random access memory. 5

(b) What are input and output devices ? Explain any one input device in brief. 5

OR

(c) Write a short note on hard disc. 5

(d) What is cache memory ? Explain. What are its advantages ? 5

5. Attempt **ALL** :

(a) What is parity code ? What are its types ? Explain with suitable example. 2½

(b) State and prove De-Morgan's theorem. 2½

(c) Differentiate between synchronous and asynchronous counter. 2½

(d) What is PROM and EPROM ? Explain. 2½