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# GF—27—2023

**FACULTY OF SCIENCE AND TECHNOLOGY**

**B.Sc. (CS) (First Semester) EXAMINATION**

**APRIL/MAY, 2023**

**(CBCS/Revised Pattern)**

COMPUTER SCIENCE

Paper BCS-104-B

(Fundamentals of Digital Electronics)

**(Thursday, 27-4-2023)** **Time : 10.00 a.m. to 1.00 p.m.**

*Time—Three Hours* *Maximum Marks*—75

*N.B.* :— (*i*) *All* questions are compulsory.

(*ii*) Figures to the right indicate full marks.

(*iii*) Assume suitable data, if required.

(*iv*) Use of any electronic media such as mobile phone, digital diary and electronic calculator is not permitted.

1. Attempt any *five* of the following (**3** marks each) : 15

(*a*) Hexadecimal Number System

(*b*) BCD Code

(*c*) Two's Complement Binary

(*d*) Ex-NOR gate

(*e*) PISO Shift register

(*f*) Half Adder

(*g*) Excess-3 Code

P.T.O.

2. Attempt any *three* of the following (**5** marks each) : 15

(*a*) Perform the following conversions :

(*i*) $(F53A)_{16} = (?)_8$

(*ii*) $(724.2)_8 = (?)_{10}$

(*iii*) $(4532)_8 = (?)_2$

(*iv*) $(111111101111010)_2 = (?)_{16}$

(*v*) $(88)_{10} = (?)_2$.

(*b*) Perform the following operations :

(*i*) $(101)_2 + (11100)_2$

(*ii*) $(110011)_2 - (1111)_2$

(*iii*) $(11)_2 \times (111)_2$

(*iv*) $(10100)_2 \div (100)_2$

(*v*) $(842)_{10} = (?)_{BCD8421}$

(*c*) State and prove DeMorgan's first and second theorem.

(*d*) Explain Decimal and Binary Number Systems in detail.

(*e*) What is Logic Gate ? Explain NAND and NOR Gates in detail.

3. Attempt any *three* of the following (**5** marks each) : 15

(*a*) Explain SOP and POS forms of Boolean functions in detail.

(*b*) Explain K-map in detail.

(*c*) Simplify the following using K-map :

$$f(A, B, C, D) = \Sigma m\,(0, 1, 2, 3, 4, 5, 8, 9, 10, 11, 14, 15)$$

(*d*) Express the following Boolean function in its standard or canonical form :

$$Y = A' + BC' + A'BC$$

(*e*) What is Multiplexer ? Explain 4 : 1 Multiplexer in detail.

4. Attempt any *three* of the following (**5** marks each) : 15

(*a*) What is Digital to Analog Converter ? Explain any *one* type in detail.

(*b*) What is Counter ? Explain 3 bit synchronous counter in detail.

(*c*) What is flip-flop ? Explain J-K flip-flop in detail.

(*d*) What is Shift Register ? Explain SIPO shift register in detail.

(*e*) What is Decoder ? Explain 2 : 4 Decoder in detail.

5. Write short notes of any *three* of the following (**5** marks each) : 15

(*a*) T flip-flop

(*b*) Full Adder

(*c*) Octal Number System

(*d*) Gray Code

(*e*) De-multiplexer.