

Roll No.

Subject Code—2077

M.C.A. (Second Year) EXAMINATION

(5 Years Integrated course)

DIGITAL ELECTRONICS

MCA-203

Time : 3 Hours

Maximum Marks : 100

Note : Attempt any *Five* questions.

1. (a) Explain in detail the advantage of digital signals and digital circuits. Realize EX-O

R gate using NAND only.

10

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

10

2. (a) Perform the following operations using 2's complement method (8-bit). 10

(i) $48 - 23$

(ii) $23 - 48$

(iii) $48 - (-23)$

(3-02-6-09)

P.T.O.

- (b) Perform the following conversions : 10
- (i) $(0.6875)_{10}$ to octal
 - (ii) $(675.625)_{10}$ to hexadecimal
 - (iii) $(4096)_{10}$ to Gray code
 - (iv) $(396)_{10}$ to BCD and excess-3 code.
3. Explain in detail the circuit and operation of CMOS NAND and NOR gates. Also mention the salient features of CMOS logic family. 20
4. (a) Minimize and realize the following function using k-map. 15
- $$f(A,B,C,D) = \pi_m(4,5,6,7,8,12). d(1,2,3,9,11,14).$$
- (b) Explain the circuit of full adder. 5
5. Convert an S-R flip-flop to a J-K flip-flop using excitation tables. Also discuss race around condition in flip-flops. 20
6. Design a synchronous decade UP counter using J-K flip-flop by ensuring that lock out does not occur. 20

7. (a) Explain the working of a 4-bit bi-directional shift register. 10
- (b) Explain the circuit of a 3-bit asynchronous binary counter. 10
8. Write short notes on the following :
- (a) Parity Generator 10
- (b) Characteristics of digital ICs. 10