2009 - RF - appeared

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)

(b) Perform the following conversions : **10**

(i) $(0{\cdot}6875)_{10}$ to octal

(ii) $(675{\cdot}625)_{10}$ 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) = π_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**