

Paper Code : 21306

F-406

**B. C. A. (Second Semester)
EXAMINATION, 2018**

(New Course)

Paper No. BCA—N-201

DIGITAL ELECTRONICS

Time : Three Hours]

[Maximum Marks : 70

Note : Attempt any *five* questions. All questions carry equal marks.

1. (a) Write the truth table and symbol of following gates :
 - (i) XOR
 - (ii) NAND
 - (iii) NOR
- (b) Represent decimal number 27 in binary form using :
 - (i) BCD Code
 - (ii) Excess-3 Code
 - (iii) Gray Code

(B-20) P. T. O.

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2. (a) Perform using 2's complement method :
 - (i) 0011.1001 – 0001.1110
 - (ii) 01100 – 00011
- (b) Minimize the four variable logic function using K-Map :

$$F(A, B, C, D) = \sum_m (0, 1, 2, 3, 5, 7, 8, 9, 11, 14)$$
3. (a) Make a 32 : 1 MUX using 16 : 1 MUX.
- (b) Design a full adder circuit and realize it.
4. (a) What do you mean by Race around condition in JK Flip Flop ? How can it be solved ? Explain.
- (b) What is the purpose of counter ? Draw the logic diagram of 3-bit synchronous counter.
5. (a) State difference between Serial Registers and Parallel Registers.
- (b) Compare and contrast state table and excitation table used in sequential circuits.
6. (a) Simplify the following expressions using Boolean Algebra :
 - (i) $AB + A(CD + \overline{CD})$
 - (ii) $\overline{A}B + ABC\overline{C} + ABC$
- (b) Design a full subtractor circuit with three inputs x, y and z and two outputs D and B . The circuit subtracts the bits $x-y-z$, where z is the input borrow, B is the output borrow and D is the difference.

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7. Design a combinational circuit with three inputs, x , y and z , and the three outputs, A , B , and C . When the binary input is 0, 1, 2, or 3, the binary output is one greater than the input. When the binary input is 4, 5, 6, or 7 the binary output is one less than the input.
8. Write short notes on any *four* of the following :
 - (a) SR Flip Flop
 - (b) Decoder and Demultiplexer
 - (c) BCD Ripple counter
 - (d) De Morgan's theorem
 - (e) SOP and POS to design combinational circuit
 - (f) Floating point representation