

(2)

- c) Draw a NAND logic diagram that implement the following function's simplified form. 4

$$F(A,B,C,D) = \pi(0,1,2,3,4,7,9,11,14)$$

- Q.2. a) What is degenerated and non degenerated form? 4
- b) Simplify the given function using k-map method and implement it using NAND gates only. 8

$$f(w,x,y,z) = \sum(0,1,2,5,7,11,13,15) + d(3,9,10)$$

OR

- a) Simplify the given function using tabulation method.

$$f(a,b,c,d) = \sum(1,3,5,6,8,9,12,14,15) \quad 8$$

- b) Obtain simplified expression in SOP form

$$F(A,B,C,D) = \pi(2,3,4,10,11) \quad 4$$

- Q.3. a) Realize the following function using 8:1 Mux. 8

$$Y(A,B,C,D) = \sum(1,2,5,6,7,8,10,12,13,15)$$

- b) What is the difference between level triggered and edge triggered flip-flop. 4

OR

- a) What is J-K master slave flip-flop? Draw its logic circuit and explain its working with truth table. 6

- b) Design a combinational circuit that converts a decimal digit 8,4,2,1 Code to 2,4,2,1 Code. 6

Total No. of Questions : 5

Total No. of Printed Pages : 3

**EH-14**

**B.E. III Semester (CGPA) Electronics and Communication Engg. Exam. 2014**

**DIGITAL ELECTRONICS**

Paper : EL-304

Time Allowed : Three Hours

Maximum Marks : 60

Note : Attempt all questions. Internal choices are given.

- Q.1. a) Represent the decimal number 8620 in  $\pi$  code. 4
- A) Excess-3 code
  - B) 8-4-2-1 code
  - C) As a binary number
  - D) As a hexadecimal number

- b) Implement a full subtractor with two half subtractors and an OR gate. 4

- c) Explain Gray code with the help of an example. 4

OR

- a) Explain any five logic operations which can be performed on two binary inputs with their symbols and truth tables. 4

- b) Perform the subtraction of the hexadecimal numbers 2F93H from 3E91H. 4

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(3)

Q.4. a) Draw a 3-bit ring counter circuit using JK flip-flop. Square wave is given as the input signal. Draw output wave forms also. 6

b) Draw the block diagram of bi-directional shift register with parallel load. 6

OR

a) Design a counter with the following binary sequence 0,1,3,7,5,4 and repeat. Use T flip-flop. 6

b) Explain the working of serial-in serial-out shift register with timing diagram. 6

Q.5. A sequential circuit has two JK flip-flops and A and B, two input x and y and one output Z. The flip-flop input equation and circuit output equation are: 12

$$J_A = Bx + B'y, K_A = B'xy'$$

$$J_B = A'x, K_B = A+xy'$$

$$Z = Ax'y + Bx'y'$$

Draw the logic diagram and derive the state equation for A and B.

OR

Compare all the logic families. 12



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