

Reg. No. :

--	--	--	--	--	--	--	--	--	--

**Question Paper Code: 41342**

B.E. / B.Tech. DEGREE EXAMINATION, NOVEMBER 2015

Third Semester

Electronics and Communication Engineering

14UEC302 – DIGITAL ELECTRONICS AND DESIGN

(Regulation 2014)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

- The equivalent hexadecimal of binary number 1011101.1011 is  
(a) B33                      (b) EFF2.F                      (c) 5 D.B                      (d) 4A.67
- Universal gates are  
(a) NAND and AND gates                      (b) NOR and OR gates  
(c) NAND and NOR gates                      (d) AND and OR gates
- The logic required to decode the binary  $(1011)_2$  by producing a HIGH indication on the output Y is  
(a)  $Y = \bar{D}C \bar{B}\bar{A}$                       (b)  $Y = D\bar{C} BA$                       (c)  $DC BA$                       (d)  $\bar{D}\bar{C} \bar{B}\bar{A}$
- A circuit with many inputs and only one output is called  
(a) de multiplexer                      (b) decoder                      (c) half adder                      (d) multiplexer
- How many flip flops are required to construct a mod 128 counter  
(a) 4                      (b) 3                      (c) 7                      (d) 5
- The output frequency of a decade counter that is clocked from a 50 KHZ signal is  
(a) 5 KHZ                      (b) 50 KHZ                      (c) 50 Hz                      (d) 12.5 KHZ

7. CMOS fan out depends on
- (a) power dissipation                      (b) propagation delay  
(c) current                                      (d) noise margin
8. A fixed architecture logic device with programmable AND gates followed by fixed OR gates is
- (a) PLA                      (b) PAL                      (c) PROM                      (d) RAM
9. A circuit which do not operate in synchronous with clock signal is
- (a) Synchronous sequential circuits                      (b) Asynchronous sequential circuits  
(c) FPGA    (d) combinational circuits
10. A state machine which uses only Input actions, so that the output depends on the state and also on inputs, is called
- (a) moore model      (b) ROM                      (c) mealy model      (d) combinational circuits

PART - B (5 x 2 = 10 Marks)

11. Differentiate multilevel and multi output gate network.
12. Draw the 4-bit binary divider.
13. State the drawbacks of RS flip flop.
14. How does a static RAM differ from dynamic RAM?
15. What are advantages of merging process?

PART - C (5 x 16 = 80 Marks)

16. (a) Simplify the following expression using Quine McCluskey method  
 $f[w, x, y, z] = \sum (0, 2, 3, 5, 6, 7, 8, 9) + d(10, 11, 12, 13, 14, 15)$   
 Realize the minimized function using NOR gates only. (16)

Or

- (b) (i) Realize the following function as Multilevel NAND –NAND gate and Multilevel NOR –NOR gate  
 $F = \bar{A} B + B (C + D) + E\bar{F} (\bar{B} + \bar{D})$  (10)

(ii) Prove that

$$(\bar{A}+\bar{B}+\bar{D})(\bar{A}+B+\bar{D})(B+C+D)(A+\bar{C})(\bar{A}+\bar{C}+D)=\bar{A}\bar{C}D+AC\bar{D}+B\bar{C}\bar{D}. \quad (6)$$

17. (a) (i) Describe the working of a full subtractor. (8)

(ii) Design 1 to 8 demultiplexer. (8)

Or

(b) Design 4 bit Binary to BCD code converter. (16)

18. (a) Explain synchronous decade counter using T flip flop. (16)

Or

(b) Write short notes on

(i) Sequence generator (8)

(ii) Ripple counter (8)

19. (a) (i) Implement the Boolean function using PLA (10)

$$w(a, b, c) = \sum m(1, 2, 4, 6)$$

$$x(a, b, c) = \sum m(0, 1, 6, 7)$$

$$y(a, b, c) = \sum m(2, 6)$$

(ii) Explain the operation of two input CMOS NOR gate. (6)

Or

(b) Describe the operation of FPGA with its architecture. (16)

20. (a) (i) Develop VHDL code for 3 to 8 decoder. (8)

(ii) Explain the method to eliminate static hazard in an asynchronous circuit with an example. (8)

Or

(b) Design an asynchronous sequential circuit that has two inputs  $x_1$  and  $x_2$  and one output  $z$ . The output  $z = 1$  if  $x_1$  changes from 0 to 1,  $z = 0$  if  $x_2$  changes from 0 to 1 and  $z = 0$  otherwise. Realize the circuit using D FF. (16)

