

## B.Tech/ECE/4th Sem/ECEN-2002/2016

2016

Digital Electronics  
(ECEN 2002)

Time Alloted : 3 Hours

Full Marks : 70

*Figures out of the right margin indicate full marks.**Candidates are required to answer Group A and any 5 (five) from Group B to E, taking at least one from each group.**Candidates are required to give answer in their own words as far as practicable***GROUP - A**

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following : [10×1=10]

- i) Gray code of  $(110101)_2$  is  
 (a) 101111 (b) 100110  
 (c) 111010 (d) 101011
- ii) Decimal equivalent of  $(1110.11)_2$  is  
 (a) 14.33 (b) 13.33  
 (c) 14.75 (d) 15.75
- iii) A combinational circuit  
 (a) never contains memory element.  
 (b) always contains memory element.  
 (c) may sometimes contain memory element.  
 (d) contains only memory element.

- iv) A Flip Flop is a/an  
 (a) monostable circuit. (b) bistable circuit.  
 (c) astable circuit. (d) none of these.
- v) Active devices used in digital circuits generally operates as  
 (a) amplifier (b) switches  
 (c) rectifier (d) waveform generator
- vi) Which of the following logic families dissipates minimum power?  
 (a) DTL (b) ECL  
 (c) CMOS (d) TTL
- vii) Maximum number of states that a counter with six flip flop can count are  
 (a) 2 (b) 8  
 (c) 64 (d) 256
- viii) MUX can be used as  
 (a) Flip flop (b) Counter  
 (c) Logic element (d) 7 segment LED driver
- ix) The number of flip-flop required for a mod-16 ring counter is  
 (a) 4 (b) 8  
 (c) 15 (d) 16
- x) The output of a gate is low if and only if all its inputs are high. It is true for  
 (a) NOR gate (b) AND gate  
 (c) NAND gate (d) X-NOR gate

GROUP - B

2. (a) Simplify the Boolean function using K-map:

$$F(A, B, C, D) = \sum m(0, 1, 2, 8, 10, 11, 14, 15).$$

- (b) What are the differences between Decoder and Demultiplexer?  
 (c) Form a multiplexer tree to give 4X1 MUX from two 2X1 MUX.

$$4+4+4 = 12$$

3. (a) Design a full subtractor using (i) NAND gates, (ii) NOR gates.  
 (b) Design a combinational circuit, which converts Excess-3 number to its corresponding BCD number.

$$6+6 = 12$$

GROUP - C

4. (a) Discuss the difference between synchronous and asynchronous sequential circuits.  
 (b) Write down the characteristic equation of S-R flip-flop.  
 (c) Realize J-K flip-flop using D flip-flop.

$$3+4+5 = 12$$

5. (a) What is the difference between a latch and an edge triggered flip-flop?  
 (b) Explain the operation of a master-slave J-K F/F.  
 (c) Explain the working principal of universal shift register with suitable logic diagram.

$$3+5+4 = 12$$

Group - D

6. (a) List four basic flip-flop applications.  
 (b) What advantage does a J-K flip-flop have over an S-R flip-flop?  
 (c) Differentiate between a D flip-flop and a D latch.  
 (d) Compare between level triggered and edge triggered flip-flop. What do you mean by race around condition?

$$2+2+2+6 = 12$$

7. (a) Design a MOD 6 ripple counter.  
 (b) What is lock out condition of a counter?  
 (c) What is the basic difference between EPROM and EEROM?

$$6+3+3 = 12$$

GROUP - E

8. (a) Draw a neat diagram of a R-2R ladder type DAC and explain its operation.  
 (b) Describe the basic principle of Successive Approximation Method for A/D Converter.  
 (c) What are RAM and ROM?

$$6+6 = 12$$

9. Write short notes on any three of the following :  
 (a) Tri-state gates in TTL family.  
 (b) EPROM  
 (c) TTL NAND GATE  
 (d) PLA  
 (e) Multiplexer

$$4+4+4 = 12$$