

B. Tech
SEM III THEORY EXAMINATION 2017-18
DIGITAL LOGIC DESIGN

Time -3.00 hr

Total Marks : 70

Note: 1. Attempt all sections. If require any missing data; then choose suitably.

SECTION – A

1. Attempt all questions in brief.**2 x 7 = 14**

- (a) Write four advantages of Digital Systems over Analog Systems.
- (b) Write the Excitation table and characteristic equation of JK flip flop
- (c) Write the difference between combinational and sequential circuits.
- (d) What is $(33)_6 + (45)_6$
- (e) Implement the Expression $Y = ABC' + BD + E$ using Nand gate only.
- (f) Convert the following
 - (i) $(562.13)_7 = (?)_{10}$
 - (ii) $(467.342)_8 = (?)_{10}$
- (g) What is race around condition?

SECTION – B

2. Attempt any three of the following:**7 x 3 = 21**

- (a) Simplify the following Boolean function using K-map
 $Y = m(0,1,3,5,6,7,9,11,16,18,19,20,21,22,24,26)$
- (b) Write the steps for combinational circuit designing and design a circuit of three input which gives an high output whenever the sum of LSB & MSB bit is 1.
- (c) Implement the function $F = m(0,1,3,4,7,8,9,11,14,15)$ using 8:1 mux
- (d) Draw and explain the PISO, PIPO register.
- (e) Draw and explain 4-bit by 3-bit multiplier

SECTION – C

3. Attempt any one part of the following:**7 x 1 = 7**

- (a) Design a universal shift register that performs HOLD, SHIFT RIGHT, SHIFT LEFT, & LOAD
- (b) Generate the hamming code for the word 11011. Assume that a single error occurs while storing the generated hamming code. Explain how this single error is detected.

4. Attempt any one part of the following:**7 x 1 = 7**

- (a) Draw and explain 4-bit magnitude comparator
- (b) Draw a decimal adder to add BCD numbers.

5. Attempt any one part of the following:**7 x 1 = 7**

- (a) Draw and explain the operation of a RTL NOR gate

6. Attempt any one part of the following:

7 x 1 = 7

- (a) An asynchronous sequential logic circuit is described by the following excitation and output function

$$y = X_1X_2 + (X_1 + X_2)Y$$

$$Z = y$$

Draw the logic diagram of the circuit, Also derive the transition table and output map.

- (b) Design a 3 bit up/down ripple counter

7. Attempt any one part of the following:

7 x 1 = 7

- (a) Write short notes on RAM and PLA
- (b) Derive the state table and state diagram of the synchronous sequential circuit shown below (X is an input to the circuit). Explain the circuit function.

