B.E. (Computer Engineering) Third Semester (C.B.S.)

Digital Electronics

P. Pages : 2 **NRT/KS/19/3333**

Time : Three Hours Max. Marks : 80

Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Assume suitable data whenever necessary.
9. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) State and prove De Morgan's theorems. **6**

b) Convert the following. **8**

1) $(11100110)_2 \rightarrow (?)_G$

2) $(DE.45)_H \rightarrow (?)_D$

3) $(145)_D \rightarrow (?)_8$

4) $(65.625)_D \rightarrow (?)_2$

OR

2. a) Convert the following in std. SOP and POS form. **8**

1) $F = \overline{A} + AB + B\overline{C}$

2) $F = (A+B)(A+C)(B+C)$

b) Why NAND and NOR are called universal gates. Implement basic gates using NAND and NOR. **6**

3. a) Design 16:1 Multiplexer using 4:1 Mux **5**

b) Design gray to binary code converter. **8**

OR

4. a) Design BCD to seven segment decoder using common Cathode arrangement. **10**

b) Explain the characteristics of display devices. **3**

5. a) Minimize the following using k-map **7**

$f(A,B,C,D) = \Sigma m(0,2,4,6,9) + d(3,8,14,15)$

b) Reduce the following and implement using NAND gate **7**

$F(A,B,C,D) = \pi M(0,3,4,5,6,7,11,13,14,15)$

OR

6. a) Design 3-bit priority encoder. **7**

b) Reduce the function using k-map **7**
$f(A,B,C,D) = A\overline{B} + \overline{A}C + ABC$

7. a) Explain the working of J-K flip flop in detail. **7**

b) What is mean by race round condition and how it can be avoided **6**

OR

8. a) Convert the following F/F **8**
1) T F/F to J-K F/F 2) S-R FF to J-K F/F

b) Explain different types of triggering of flip-flop. **5**

9. a) Design 4-bit up-down ripple counter using T F/F **7**

b) Explain Twisted ring counter **6**

OR

10. a) Differentiate between synchronous and asynchronous counter. What is mean by modulus of counter. **6**

b) Design modulo-10 synchronous counter using suitable flip flop **7**

11. a) Design 4-bit BCD adder using 4-bit binary adder. **7**

b) Write short note on ALU **6**

OR

12. a) Design full subtractor using 2 half subtractor. **7**

b) Explain Monostable multivibrator with waveform. **6**

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