Mid-West University

Examinations Management Office

End-Semester Examinations -2080

Bachelor level / B.E. Computer / 2nd Semester — Full Marks: 50
Time: 3 hours — Pass Marks: 25
Subject: Logic Circuits (EX421/EX501)

- *Attempt all the questions*
- *Figures in the margin indicate full marks.*
- *Assume suitable values, with a stipulation, if necessary.*
- *Candidates are required to answer the questions in their own words as far as possible.*

1. Perform the following operation: **1x5**

i) $(76526.543)_8 = (?)_{16}$
ii) $(89744.012)_{10} = (?)_8$
iii) $(10111001001.100101)_2 = (?)_{10}$
iv) Convert $(11011011)_2$ to Gray code
v) Find the 2's compliment of $(101110110110)_2$

2. Why NAND and NOR gates are called universal gates? Explain your answer. **4**

3. Simplify the following Boolean function using K- map in a i) Product of sum and ii) Sum of products and implement it with logic gates: **3+3**
$F(W,X,Y,Z) = \sum (0,1,3,6,8,12,14)$ and don't care conditions: $d(W,X,Y,Z) = \sum(4,5,10,13)$.

4. Explain magnitude comparator with necessary circuit diagram. **4**

5. Divide $(1011101)_2$ by $(101)_2$ using repeated subtract and left shift algorithm. **4**

6. Explain about the switch contacts bound circuits with necessary diagram. **4**

7. Explain SIPO register with its timing diagram. **3**

8. Explain about 3-bit ripple up counter with timing diagram. **5**

9. **a.** A synchronous machine has one-bit serial input A and the output B of the machine is to be set high when the input contains the message '011'. Draw the state diagram, derive state table and design the circuit diagram. **6**

b. Explain about the Critical race in sequential machine **2**

10. Differentiate between TTL and CMOS. Briefly explain TTL-to-CMOS interface. **3+2**

11. Explain briefly about the Frequency counters. **2**

The End