National University

of Computer and Emerging Sciences Chiniot-Faisalabad Campus

Instructor: Muhammad Adeel Tahir **EE1005 – Digital Logic Design**

Quiz# 1

Name:		**Section:**	CS - N	**Roll Number**				-				
Total Marks:	40 Marks	**Total Time:**	40 mins	**Marking (do not fill these)**								
Obtained Marks												

- Questions must be solved in the space provided for them, incase answers are not in the respective fields, they will not be marked
- Use extra rough sheets or spaces provided for your rough works, do not make a mess on the solution areas.
- MCQ questions must not have any cutting whatsoever, if more than one option is marked, it will be marked as incorrect.
- Only use permeant ink pen for marking your answers, answers written with pencils will not be checked.

Multiple Choice Questions: ***Circle the correct option*** or options (if more than one is correct) for the following questions. Once marked, any cutting will lead to 0 mark for the MCQ. **[10 marks]**

1. The given hexadecimal number $(1E.53)_{16}$ is equivalent to:

a) $(35.684)_8$ b) $(36.246)_8$ c) $(34.340)_8$ d) $(35.599)_8$

2. The octal number $(651.124)_8$ is equivalent to _____

a) (1A9.2A)16 b) (1B0.10)16 c) (1A8.A3)16 d) (1B0.B0)16

3. Binary subtraction of 101101 – 001011 = ?

a) 100010 b) 010110 c) 110101 d) 101100

4. The binary number 10001101010001101111 can be written in hexadecimal as

(a) $AD467_{16}$ b) $8C46F_{16}$ c) $8D46F_{16}$ (d) $AE46F_{16}$

5. On subtracting (010110)2 from (1011001)2 using 2's complement, we get _____

a) 0111001 b) 1100101 c) 0110110 **d) 1000011**

6, On addition of +38 and -20 using 2's complement, we get _____

a) 11110001 b) 100001110 c) 010010 d) 110101011

7. An overflow occurs in _____

a) MSD position b) LSD position c) Middle position d) Signed Bit *(MSD|LSD , D refers to digit)*

8. The advantage of 2's complement system is that _____

a) Only one arithmetic operation is required b) Two arithmetic operations are required

c) No arithmetic operations are required d) Different Arithmetic operations are required

9. For arithmetic operations only _____

a) 1's complement is used b) 2's complement c) 10's complement d) 9's complement

10. The excess-3 code for 597 is given by _____

a) 100011001010 b) 100010100111 c) 010110010111 d) 010110101101

Answer Box (mark the correct letter i.e a,b,c,d in SEQUENCE)

For Rough Work Only

Question 1: Convert the decimal number 97.7_{10} into a number with the same value represented in the following bases. The exact value requires an infinite repeating part in the fractional part of the number. Show the steps of your derivation.

(a) binary (b) octal (c) hexadecimal (d) base 3 (e) base 5 **[1+1+1+1+1+3 = 8 marks]**

(a) Binary	**(d) Base 3**
(b) Octal	**(e) Base 5**
(c) Hexadecimal	**Convert $(64^{1/3})_5$ to Hexadecimal. (if possible) [3 marks]**

Question 2: Add the following numbers in binary using both 1's and then 2's complement to represent negative numbers. Use a word length of 6 bits (including sign) and indicate if an overflow occurs **[2 + 2 = 4 marks]**

a) (−10) + (−11)
1's Complement: **2's complement:**

b) (−8) + (−11)
1's Complement: **2's complement:**

Question 3: One of the following bit patterns is valid BCD (binary-coded decimal), but the other one is not, Which one is not valid? For credit to be given, you must give a correct reason. **[2 marks]**

1. 100110110100

2. 100100111000

Which one is valid? _____

Why is the other one not valid:

Question 4: Find the 9's and the 10's complement of the following decimal numbers: **[4 marks]**

a) 00000000 9's Complement:	10's Complement:	**b) 5274630** 9's Complement:	10's Complement

Question 5: Add the signed numbers: 01000100, 00011011, 00001110, and 00010010 and write your final answer in the provided space. **[2 marks]**

Working: (Show decimal and binary working side by side) **BINARY WORKING**		**DECIMAL WORKING**
Final Answer:	(In Binary):	(In Decimal):

Question 6: Add the following BCD numbers: **[2 + 2 = 4 marks]**

(c) 00010110 + 00010101	**(d) 01100111 + 01010011**

Question 7 Gray code conversions. Attempt the following parts carefully. **[1+1+2 =4 marks]**

(a) Convert the binary number 11000110 to Gray code	(b) Convert the Gray code 10101111 to binary.
(c) The ten-bit Gray code for $(353)_{10}$ is 0111010001. Explain briefly but precisely why it cannot be true that 0111010100 is the ten-bit Gray code for $(354)_{10}$. **Also calculate gray code for 354_{10}** **Gray Code for $(354)_{10}$:**	**Explanation:**

Question 8: Construct a 6-2-2-1 weighted code for decimal digits. What are all possible combinations through which the 9823_{10} can be constructed using the weight in 6-2-2-1? **[4 + 3 = 7 marks]**

Decimal	6	2	1	1

Different Combinations to represent **9823_{10}**

FOR ROUGH WORK ONLY (will not be checked):