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UNIVERSITY REGULAR EXAMINATIONS

2013/2014 ACADEMIC YEAR

1ST YEAR 1ST SEMESTER EXAMINATIONS

FOR THE DEGREE
OF
POST GRADUATE DIPLOMA IN IT

COURSE CODE: PGD 713

COURSE TITLE: INTRODUCTION TO DIGITAL LOGIC

DATE: 24TH APRIL, 2014 **TIME: 9:00A.M.-12 NOON**

INSTRUCTIONS

- Answer **QUESTION ONE a**nd attempt **ANY OTHER TWO** questions from the following five questions

1(a) Distinguish between the following
I combinational and sequential circuits
Ii register and memory
Iii a digital and analogue signal 6 marks

(b) A binary pattern is given as 1001011101010100 determine its decimal equivalent if the pattern is considered to be a:
I BCD number
Ii Excess three BCD
Iii signed binary 3 marks

(c) Convert the following decimal numbers to binary
I 567
Ii 47.25 4 marks

d) State any TWO features that can be used to evaluate the performance of logic families 2 marks

e) With aid of truth table determine the output expression implement even parity bit for a four input binary bit.
5 marks

2(a) With the aid of a truth table show that sums part of a full adder circuit can be implemented using exclusive all only and hence implement the full adder
14 marks

(b) Distinguish between
I min term and maximum term
Ii parallel adder and serial adder
Iii Positive and Negative logic 6 marks

3(a) With aid of a circuit diagram and truth table explain the operation of 3 input TTL NAND gate. 10 marks

(b) Explain any two problems associated with the totem pole output 4 marks

(c) A TTL NAND gates has the following output parameters
I_{OH} = 500μA, I_{IH} = 50μA and I_{OL} = 16mA, I_{IL} = 0.8 mA determine the fan out for :
I High output
Ii low output 6 marks

4(a) With aid of circuit diagram and truth table explain the principle operation of RS NAND gate flip flop 10 marks

(b) With aid a timing waveform and logic circuit implement a modulo 10 synchronous counter 10 marks

5(a) Distinguish between the following
I a ring counter and Johnson counter
Ii PIPO register and SIPO 4 marks

(b) Data is received over common line but has to be distributed over four devices. With aid of truth table Implement logic circuit to solve this problem 10 marks

(c) Map on K-Map the exclusive OR function as Sum Of Products and as Product of Sums 6 marks