TEST 1 SEMESTER I 2015/2016 (ANSWER)

PART B: 4 SUBJECTIVE QUESTIONS [Total mark 70 points]

Question 1 [20 Marks]

A digital system with periodic digital waveform has a pulse width, t_w, of 25µs and a period, T, of 150µs.

a) Convert the **period** to the unit of millisecond (ms). 0.15ms

b) How many **cycles** are there in 10ms? 66.66 or 66 cycles.

c) What is the **frequency** of the system? 6.67 KHz

d) Calculate the **on** and **off** state of the system in µs. [4m]

On state = 25µs. Off state = 125 µs

e) Calculate the **duty cycle** of the system. 16.67%

Question 2 [20 Marks]

a) Convert the following numbers to its **decimal** equivalent. [7m]

i. $1011_3 = 58_{10}$

ii. $9E.A_{16} = 158.625_{10}$

b) Convert the decimal number 122.63_{10} to its **binary** equivalent (to five radix points). ANSWER: 111 1010 . 10100

c) Convert 114.6_8 to its: [6m]

i. **binary** equivalent. 001 001 100 . 110

ii. **hexadecimal** equivalent. 4 C . C

Question 3 [25 Marks]

a) Convert the Gray Coded value **1001 1011** to its **binary** equivalent. [5m]

1110 1101

b) Perform the operation below using **8 bits 2's complement** where appropriate. Show all your works clearly. [8m]

i. 15 + 20 = 0010 0011 (35)

ii. 50 – 30 = ~~1~~ 0001 0100 (20)[

c) A system using **even** parity received the following ASCII hexadecimal value, **CCCF47C9C3$_{16}$** (receives MSB first). By referring the ASCII table given in Appendix (refer Table 1 in Page 12), find the ***message*** by completing Table 2.

Message = LOGIC

Question 4 [15 Marks]

a) Given the input waveform A and B in the logic circuit of Figure 1(a), draw the appropriate **output waveform** for X by filling the Figure 1(b). [9m]

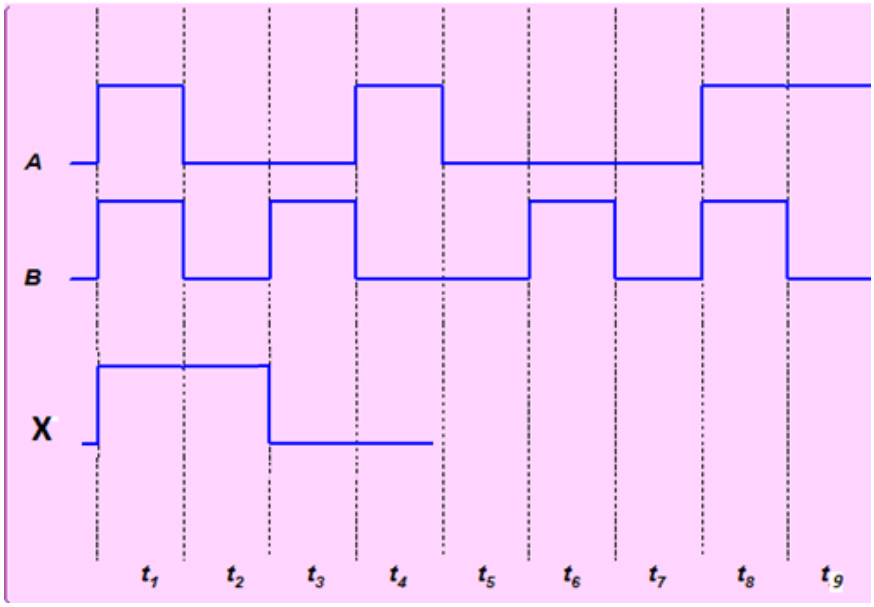

Figure 1(b): Output waveform of logic circuit in Figure 1(a)

b) Fill in the **truth table** of Table 3 below based on your answer in Question 4(a).

c) Which **single gate** does Table 3 represents [2m].

___XNOR_____