Name (Pin Yin): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Assin. No.: \_\_\_\_\_\_

**CQUPT EE310 2017 Fall Quiz 3b**

**(20min, 30pts)**

1. (4pts) For a 7-seg LED display, all outputs are active LOW.
   1. Write the input binary code to display the hexadecimal number ‘C’.
   2. What is the logic level for each output in order of abcdefg?
2. 1100
3. 0110001
4. (8pts) Read the following VHDL program and answer the questions.
   1. How many input and output ports in the entity named dec1?

2 input ports and 1 output port

* 1. How many input and output pins in this circuit?

6 input pins and 2 output pins

* 1. What is the official name of the circuit realized by this VHDL code?

4-to-1 multiplexer

* 1. What is the output O if sel<=”01” and d\_in<=X”A”?

O <= d\_in(1), which is ‘1’

library ieee;

use ieee.std\_logic\_1164.all;

entity mux4 is

port( d\_in: in std\_logic\_vector(3 downto 0);

sel: in std\_logic\_vector(1 downto 0);

O: out std\_logic

);

end mux4;

architecture behv of mux4 is

begin

process (sel,d\_in)

begin

case sel is

when "00" => O <= d\_in(0);

when "01" => O <= d\_in(1)";

when "10" => O <= d\_in(2);

when "11" => O <= d\_in(3)";

end case;

end process;

end behv;

1. (5pts) Rewrite the architecture in question 2 using if statement.

architecture behv of mux4 is

begin

process (sel, d\_in)

begin

if sel=”00” then

O <= d\_in(0);

elsif sel=”01” then

O <= d\_in(1);

elsif sel=”10” then

O <= d\_in(2);

else

O <= d\_in(3);

end if;

end process;

end behv;

1. (4pts) Define a 8-bit signal ***address*** of type std\_logic\_vector, then assign the value X”E6” to it using a separate statement.

signal address : std\_logic\_vector;

address <= X”E6”;

1. (9pts) A signal is defined as std\_logic type, please explain what the following values mean.

‘U’: \_uninitialized\_\_\_\_\_\_\_\_\_\_\_\_\_ ‘X’: \_\_force unknown\_\_\_\_\_\_\_\_\_\_\_\_

‘0’: \_\_force logic 0\_\_\_\_\_\_\_\_\_\_\_\_ ‘1’: \_\_\_force logic 1 \_\_\_\_\_\_\_\_\_\_\_\_\_

‘Z’: \_\_high impedance\_\_\_\_\_\_\_\_\_ ‘W’: \_\_weak unknown\_\_\_\_\_\_\_\_\_\_\_

‘L’: \_\_\_weak zero\_\_\_\_\_\_\_\_\_\_\_\_\_ ‘H’: \_\_weak one\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

‘-‘ : \_\_don’t care\_\_\_\_\_\_\_\_\_\_\_\_\_\_