

**Department of Higher Education  
University of Computer Studies, Yangon  
Second Year (B.C.Tech.)  
Final Examination  
Digital System Design (CT 205)  
October, 2018**

**Answer ALL Questions**

**allowed: 3 hours**

- 1(a) (i) What is the difference between a local interconnect and a global interconnect in an Field-Programmable Gate Arrays (FPGAs)? (2 marks)
- (ii) What is a cloud storage system? (2 marks)
- (iii) What is the resolution of a 5 bit DAC? (2marks)
- (iv) What is the difference between baseband and broadband? (2 marks)
- (b) (i) What are some common types of analog to digital converter? (4 marks)
- (ii) Describe the basic memory operations. What is a read operation? (4 marks)
- (iii) Describe the Time -Division Multiplexing (TDM). (4 marks)
- 2(a) (i) Show how a Programmable Array Logic (PAL) is programmed for the following 3-variable logic function:  $Y = A\bar{B}C + \bar{A}B\bar{C} + ABC$ . Use an X to indicate a connected link. (4 marks)
- (ii) How to implement the 3-variable LUT programmed to produce the following SOP function. (8 marks)
- $$A_2\bar{A}_1\bar{A}_0 + \bar{A}_2\bar{A}_1\bar{A}_0 + \bar{A}_2A_1A_0 + A_2\bar{A}_1A_0 + \bar{A}_2\bar{A}_1A_0$$
- (b) Determine the final SOP output function for the logic module shown in Figure 2 (b). (4 marks)
- (c) Determine the output expression of the LUT for the internal conditions shown in Figure 2 (c). (4 marks)
- 3(a) Use 64k x 4 ROMs in Figure 3 (a) to implement a 64k x 16 memory. (8 marks)
- (b) What is the bit storage capacity of a ROM with 64k x 16 ROM? How many address bits are required for 64k x 16 ROM? (4 marks)
- (c) Determine the output of the DAC in figure 3(c) if the waveforms representing a sequence of 4 bit numbers in right part is applied to the inputs. Input  $D_0$  is the least significant bit (LSB). The data inputs have a low value of 0V and high value of +5V. (8 marks)

- 4(a) List four types of digital to analog converter error. Determine the output of a DAC when a straight 4-bit binary sequence is applied to the inputs the  $2^0$  bit is stuck HIGH. (8 marks)
- (b) Develop the Pulse Amplitude Modulation (PAM) signal and the Pulse Width Modulation (PWM) signal for the waveform in Figure 4 (b). (6 marks)
- (c) List four types of modulation techniques. Determine the binary code represented by the Amplitude-Shift Keying (ASK) signal in Figure 4 (c). Presence of a signal is a 1 and absence of a signal is 0. (6marks)
- 5(a) A certain bus is specified with a width of 32 bits and a frequency of 66 MHz. Determine the bus bandwidth expressed as two different values, according to the decimal and binary definitions of M. Note that Bps is bytes per second. (4 marks)
- (b) List **five** types of addressing modes. Explain immediate addressing mode. (8 marks)
- (c) (i) Pipelining Techniques (4 marks)  
(ii) Interrupt and Exceptions (4 marks)