

Term End Examination - May 2013

- Digital Electronics and Microprocessors Course **ITE205** Slot: G1+TG1

Class NBR: 3985

Time **Three Hours** Max.Marks:100

Answer ALL Questions 1. Prove that the logical sum of all minterms of a Boolean function of 3 variables is 1. [4] a) b) Draw a logic diagram using only two input NAND gates to implement the following [4] expression (AB+A'B')(CD'+C'D). c) Perform the following conversion [2] $AC21_{16} = (?)_{8.}$ 2. Simplify the Boolean function a) [5] $F(w,x,y,z) = \sum (0,1,2,4,5,6,8,9,12,13,14).$ b) What is the largest binary number that can be represented with 12 bits? What is the [5] equivalent decimal, hexadecimal and octal number? 3. (a) i) Explain the working of BCD adder with an example. How it is different from binary [5] adder? ii) Design 16×1 Multiplexer using only 2×1 multiplexers. [5] OR 3. (b) i) Design Full subtractor using decoder. [5] ii) Design a combinational circuit with 3 inputs x,y,z and 3 outputs A,B,C, When the [5]

- binary input is 0,1,2,3 then the binary output is one greater than the input and when the binary input is 4,5,6,7 binary output is one less than the input.
- 4. Draw the circuit of 'D' flip-flop and explain the operation of it. Construct J K flip-flop [10] using 'D' flip-flop.

Design a counter with 'D' flip-flops that goes through the following binary repeated [10] sequence 0,1,3,7,6,4. OR 5. (b) What are the different types of shift registers and explain them briefly? The content of a [10] 4-bit register initially 1101. The register is shifted 6 times to the right with the serial input being 101101. What is the content of the register after each shift? 6. What is the purpose of converting analog signals into digital? And with a neat sketch [10] explain the operation of Successive Approximation ADC. 7. With a neat sketch, explain the internal architecture of 8086 microprocessor. [10] 8. a) What are the various types of interrupts in 8086 microprocessor? Explain them briefly. [5] Which interrupt has the highest priority? b) Explain CALL, LOOP and RET instructions in 8086 microprocessor. [5] 9. What are the different operating modes of 8255? Explain them briefly. Describe the [10] control word bits for 8255. 10. Design XOR gate with NAND gates. [2] a) Design 2-bit asynchronous binary up counter. b) [2] Compare and contrast Successive approximation ADC and Dual slope ADC. [2] c) What are SIM and RIM instructions? d) [2] e) Explain shortly about DMA controller. [2]

5.

 $\Leftrightarrow \Leftrightarrow \Leftrightarrow$