

Date: 02 May 2022

Maximum Marks: 50, Time: 120 Minutes

Note: Attempt all questions.

**PART A: Short Answer Questions**

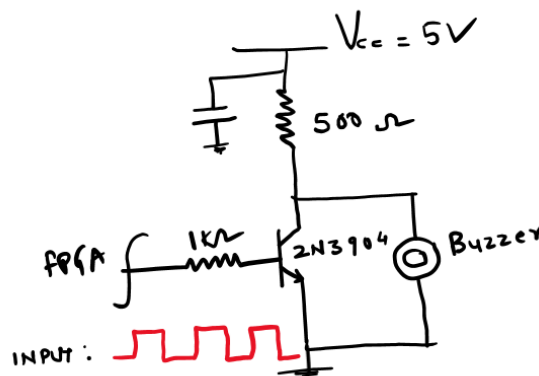
Q 1: What are the three parts of Radio Frequency Identification (RFID). What is the operating frequency of NFC? [2 Marks]

Q 2: Mention the three steps involved to convert an analog signal to digital form. [2 Marks]

Q 3: What is DTMF stands for? Write the IC number for a DTMF decoder. Write any two applications for DTMF. [2 Marks]

Q 4: What are the two modes through which LCD can be interfaced with FPGA. What is the advantage of each mode of operation? [2 Marks]

Q 5: For the given circuit, state the input conditions when the buzzer will be ON and OFF. [2 Marks]



Q 6: List four design metrics for a basic embedded system design. [2 Marks]

Q 7: In AT89C51 and AT89LV52, what is the meaning of each part (AT, C, LV, 8951, 8952) [2 Marks]

Q 8: What do you understand by  $\overline{EA}$  pin of 8051 being at logic HIGH and logic LOW. [2 Marks]

Q 9: Perform hex subtraction  $60F - 1A7$ . Add  $40BH$  and  $F6H$ . [2 Marks]

Q 10: What are the different types of buses used in 8051. The content of R1 and A after execution of Instruction  $MOV A, \# 22H$  followed by  $MOV R1, A$  [3 Marks]

Q 11: The instruction  $MOV A, \# 40 H$  uses ..... addressing mode [ 2 Marks]

Q 12: In given VHDL code, if at  $T= 0 s$  ( $A=0, B=0$ ) and at  $T = 1 s$  ( $A=1, B=1$ ), then SUM and CARRY at 7 ns will be [ 2 Marks]

architecture DIFFICULT of HALF\_ADDER is

begin SUM <= A xor B after 5 ns;

CARRY  $\leq$  A and B after 3 ns;

end DIFFICULT;

**PART B: Long Answer Questions (Give point-to-point answer)**

Q 1: What are the five attributes of “things” in Internet of Things? [5 Mark]

Q 2:

- a) Describe briefly (in maximum three points) about Pseudorandom binary sequence generator (PRBS). [3 Marks]
- b) Write the polynomial expression for a PRB sequence of (11001) which uses four shift registers. [2 Marks]

Q 3: Write five criteria for choosing 8051 for an embedded system design. [5 Marks]

Q 4: What are the different addressing modes used by 8051 microcontroller. Give one example of each mode. [5 Marks]

Q5:

- a) Compare an embedded system with a general-purpose system citing real-time examples. [2 Marks]
- b) What is difference between hard real-time system and soft real-time system. Cite one example for each case. [3 Marks]

02/05/2022