



School of Computer Science Engineering and Information Systems
WINTER SEMESTER 2023-24

CONTINUOUS ASSESSMENT TEST - II

Programme Name & Branch : B.Tech - IT

Course Name & Code : Digital Logic and Microprocessors & BITE202L

Class Number(s) : VL2023240503035/ VL2023240503036/ VL2023240503040

Faculty Name(s) : Dr.Malaserene I, Dr.Nithya S, Dr.Karthikeyan D

Duration : 90 minutes Max. Marks : 50

General instruction(s): Answer all the questions

1. A New clocked X-Y flip-flop is defined with two inputs, X and Y is addition to the clocked input. The flip flop functions as follows: **(10 Marks)**

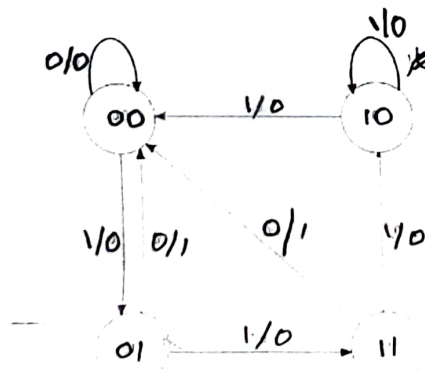
If $XY=01$, the flip flop state (Q) becomes 1 at the next clock pulse.

If $XY=10$, the flip flop state (Q) becomes 0 at the next clock pulse.

If $X=Y$, the flip flop toggles its state (Q) at the next clock pulse.

For the above conditions derive the following

- Provide the truth table for the X-Y flip flop
 - Provide the characteristics table
 - Provide the Excitation table for the X-Y flip flop
 - Implement in X-Y flip flop using JK flip flop
2. Design a clocked synchronous sequential logic circuit using JK flip flops for the following state diagram.



- Tabulate the state table and Excitation table
- Derive the state equations
- Draw the logic diagram of the circuit.

(10 Marks)



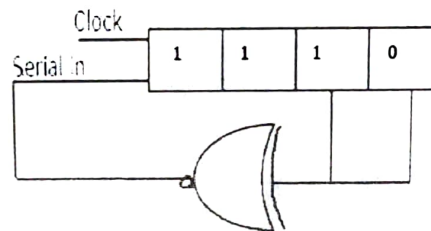
VIT

Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

Slot : D1+ TD1

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3. Design a synchronous counter for the count sequence 0-3-5-7-2-1-0 using positive edge triggered D flip-flop. (10 Marks)
4. i. The contents of a four-bit register are initially 0110. The register is shifted six times to the right with the serial input being 1011100. Evaluate the content of the register after each shift. (5 Marks)
- ii. The initial contents of the 4-bit ring counter are 1110. List the contents of the shift registers till it reaches 0000. Also Specify the number of clock pulses needed to get 0000. Draw the waveform for five clock pulses. (5 Marks)



5. i. Calculate the effective address for the following register: SS: 3640H, SP: 1735H, BP: 4826H.
- ii. The value of the DS register is 3032H. And the BX register contains a 16 bit value which is equal to 3032H. 0008H is added to BX.
ADD BX, 0008H
The register AX contains some value which needs to be stored at a location as follows:
MOV [BX], AX Calculate the address at which the value of the AX will be stored.
- iii. Identify the addressing modes for the following instructions:
- MOV AX, [BP+2]
 - JMP [DI]
 - JMP [DI+2]
- (10 Marks)