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| **Course Name:** | **Digital Electronics** | **Semester:** | **III** |
| **Date of Performance:** |  | **Batch:** | **A - 3** |
| **Faculty Name:** |  | **Roll no.:** | **16014022050** |
| **Faculty Sign & Date:** |  | **Grade/Marks:** | **\_\_\_ / 25** |

**Experiment no.: 7**

**Title: Study of Asynchronous Counter**

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| **Aim and Objective of the Experiment:** |
| * Implementation of decade counter using IC 7490. * Implement mod 6 counter using 7490. |

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| **COs to be Achieved:** |
| **CO3**: Design sequential circuits using MSI devices. |

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| **Theory:** |
| **Asynchronous Counters –**  In asynchronous counters universal clock is not used, only the first flip flop is driven by the main clock and the clock input of the rest of the flip flops is driven by output of previous flip flops. This can be seen in following diagram    **Asynchronous Counter Circuit –**  In this circuit, Q0 is toggling on the rising edge of the clock pulse, Q1 is changing when the rising edge of Q0 is encountered (because Q0 is like clock pulse for second flip flop) and so on. In this way binary count is generated and ripples are created through Q0, Q1, Q2, Q3 hence it is also called RIPPLE counter. |

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| **Circuit Diagram/Block Diagram:** |
| **IC 7490** is an asynchronous decade counter, which has mod 2 and 5 counter internally.   1. **Mod 6 –**      1. **Decade Counter –** |

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| **Stepwise – Procedure:** |
| 1. **Implement asynchronous decade counter using 7490.**                1. **Implement a mod 6 counter using IC 7490.** |

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| **Post Lab Subjective/Objective type Questions:** |
| 1. **One of the major drawbacks to the use of asynchronous counters is that \_\_\_\_\_.**    1. **Low-frequency applications are limited because of internal propagation delays High-frequency applications are limited because of internal propagation delays.**    2. **Asynchronous counters do not have major drawbacks and are suitable for use in high- and low-frequency counting applications.**    3. **Asynchronous counters do not have major drawbacks and are suitable for use in high- and low-frequency counting applications.** 2. **A counter is implemented using three (3) flip-flops, possibly it will have \_\_\_\_\_ maximum output status.**    1. **3**    2. **7**    3. **8**    4. **15** 3. **Comment on limitation of frequency of asynchronous counters** 4. **Show how a Mod 6 counter can be designed using 3-bit asynchronous counter.** 5. **Design a 00 to 99 counter using IC 7490.** |

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| **Conclusion:** |
| From this experiment, successfully learned how to design sequential circuits using MSI devices, specifically implementing a decade counter and a mod 6 counter using IC 7490. |

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| **Signature of faculty in-charge with Date:** |