For combinations cells (depending on number of inputs – example, inverter has only A input), the following characterizations have to be performed and filled. Remove all unwanted rows.

1. **Input pin capacitances:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Input Pins** | **Rise Cap (fF)** | **Fall Cap (fF)** | **Average Cap (fF)** |
| A | 2.59 | 2.58 | 2.585 |

1. **Transition Time Table:** (please strictly consider 20% and 80% of VDD for transition time)

**(i) Output Rise Transitions** **(in ps)** [Input slew vs output capacitance].

**Related pin A**:

|  |  |  |  |
| --- | --- | --- | --- |
|  | **10 ps** | **100 ps** | **1000 ps** |
| **0.5 fF** | 12.63 | 23.6 | 88.0 |
| **10 fF** | 67.38 | 67.78 | 182.6 |
| **100 fF** | 597.4 | 597.4 | 609.6 |

**(ii) Output Fall Transitions** **(in ps)** [Input slew vs output capacitance].

**Related pin A**:

|  |  |  |  |
| --- | --- | --- | --- |
|  | **10 ps** | **100 ps** | **1000 ps** |
| **0.5 fF** | 13.02 | 20.3 | 79.1 |
| **10 fF** | 71.7 | 71.89 | 173.7 |
| **100 fF** | 640.5 | 640.5 | 647.2 |

1. **Propagation delay time tables**: (unlike textbook definitions that we used for our assignments, here we will use 50% of input to 50% of output to simulate propagation delay – by keeping other inputs fixed).

**(i) Cell Rise Delay (in ps)** [Input slew vs output capacitance].

**Related pin A**:

|  |  |  |  |
| --- | --- | --- | --- |
|  | **10 ps** | **100 ps** | **1000 ps** |
| **0.5 fF** | 13.5 | 30.5 | 74.3 |
| **10 fF** | 52 | 74.5 | 216 |
| **100 fF** | 413 | 436 | 667 |

**(ii) Cell Fall Delay (in ps)** [Input slew vs output capacitance].

**Related pin A**:

|  |  |  |  |
| --- | --- | --- | --- |
|  | **10 ps** | **100 ps** | **1000 ps** |
| **0.5 fF** | 17 | 32.5 | 69.9 |
| **10 fF** | 64 | 83.4 | 212 |
| **100 fF** | 499 | 520 | 725 |

1. **Static Power (cover all possible input combinations based on number of inputs).**

|  |  |
| --- | --- |
| **Condition (A)** | **Power (nW)** |
| 0 | 0.112 |
| 1 | 0.112 |

1. **Dynamic Power Table:**

Considering T= 3000ps throughout all the simulations

**(i) Rise Power (in nW)** [Input slew vs output capacitance].

**Related pin A**:

|  |  |  |  |
| --- | --- | --- | --- |
|  | **10 ps** | **100 ps** | **1000 ps** |
| **0.5 fF** | 779 | 1001 | 1052 |
| **10 fF** | 580 | 750 | 1019 |
| **100 fF** | 525 | 550 | 748 |

**(ii) Fall Power (in nW)** [Input slew vs output capacitance].

**Related pin A**:

|  |  |  |  |
| --- | --- | --- | --- |
|  | **10 ps** | **100 ps** | **1000 ps** |
| **0.5 fF** | 1160 | 2770 | 6009 |
| **10 fF** | 1268 | 7002 | 22946 |
| **100 fF** | 1287 | 7943 | 65922 |