

Q.3. Once the head reaches the track, we have to wait for the sector to pass under the head.

Since, the position of sector is unknown when the head reaches the track, a guess is made and we have to wait for half a rotation. If the disk rotates at R revolution per unit time the rotational latency is $\frac{1}{2R}$.

The rotational latency, which is incurred for each request only depends on a disk parameter, R . It can therefore be ignored because it will be the same for all scheduling algorithm.

Q.2. In polling, the CPU explicitly checks the device until the device indicates that it is done.

In interrupt, the external / peripheral devices try to stop the CPU executing some tasks.

In polling, the device driver writes the parameters in operand register and requested instruction code in the opcode register. Controller then triggers the device to execute the operation and at the same time busy register is set to indicate that device is busy. Once the CPU reads the non-busy, it checks the status register for any error and if no error it starts transferring data.

The advantage of polling is that, the CPU bandwidth devoted to I/O is controlled by the system, not by the device. Polling based systems are better protected against the devices that malfunction and that would flood the system with interrupts.

Q.1 In the generic structure of a device driver, the Interrupt Service Routine of the device driver is called whenever the operation completes on the device controller and an interrupt is raised.

Because, the execution of Interrupt Service Routines is so disruptive to the rest of the system, device driver designers separate the time-critical operations from not so critical operations.

The time critical operations are packed into ISR which executes immediately when interrupt is raised. The remaining opⁿ are packed into the DPC routine, which is queued up to be executed after the ISR returns. When the system is done executing ISR, it checks whether there are DPCs to be executed. As a result ISR are shorter and less disruptive.

For example, declaring device as no longer busy is more important than transferring the data. The latter operation can be delayed and executed when CPU is idle.