**Week 11 Tutorial/Practical Questions**

**Q1:**

* Early “Infant Mortality” Failure
* Constant random failures.
* Wear out failures.

1. Early infant mortality failure of a recently bought storage device that I had written a substantial amount of important data to. Unsure of the cause, but I expect there was an issue with the spin up of the memory disk.
2. Manufacturers put effort into maintaining high standards in their products. Unfortunately, manufacturing errors cannot be completely eliminated and still occur sometimes.
3. Backing up important data on a secondary storage device or on cloud storage. The supplier should take accountability, which they did, but unfortunately the data was already lost. It would make financial sense if the failure rate were within profitability expectations and it was not a recurring issue e.g., a full product recall.

**Q2:**

1. If the contents of the capacitor, a non-solid-state capacitor with liquid internals, was exposed to external elements like oxygen and the liquid oxidizes or degrades, pushing the internal components out and leaking over the motherboard and other system components.
2. Dust, degradation of the moving components like the bearings, system failure when requesting movement from the fan.
3. Power overload from a non-recommended power source, external contaminants like water or dust, over-use.
4. Hard impact causing a head-crash, foreign debris like dust, motor failure, loss of alignment, bearing wear.
5. Bearing wear, unbalanced spin potentially causing a disk shatter, motor failure.

**Q3:**

1. An elongated disk spin-up time can be a sign of possible motor failure or bearing wear.
2. A sign of negative wear on disk sectors, rendering them unable to be written to.
3. Indicates that the storage drive is nearing its total maximum use hours and is likely to fail soon.
4. Indicates the total amount of times the disk has been powered on or off. A sign that the disk spin-up and power on functions are likely to fail soon.

**Q4:**

1. 5TB.
2. Every 40,000 hours.
3. However long it takes to read from the back up disks and write to the spare disk, then read from the spare disk and write to the new disks.

Read: 500GB = 500,000MB / 95 = 5263.16 seconds = 87.7 minutes = 1.46 hours.

Write: 500,000 / 90 = 5555.55 seconds = 92.6 minutes = 1.54 hours.

Times 2 = 3.08 hours.

1. If the system goes down, or damage is occurred to the disk that is being rebuilt, or the disk that it is being rebuilt from, then the data is completely lost.

**Q5:**

Using special software and connectors that allow for hot swapping. Most SCSI connections allow this feature.

**Practical Questions:**

Yes, they allow the user to have better confidence in their devices. If I am looking for a higher quality product, or the data I was storing was of high important I would seek out better, and longer coverage. When warranties cost additional money and the user is installing a high amount of drives.