

**Quiz # 4**  
**Computer Organization & Architecture**  
**BESE 15 B (22 Dec 2010)**

**Time allowed 10 Min**  
**Marks: 10**

Q#1. Verify the Rotational delay (average latency rate) cited in the disk specification of Figure bellow. ( 5 Marks)

<b>CONFIGURATION:</b>		<b>RELIABILITY AND MAINTENANCE:</b>	
Formatted Capacity, MB	147,000	MTTF	300,000 hours
Integrated Controller	SCSI	Start/Stop Cycles	50,000
Encoding Method	EPRML	Design Life	5 years (minimum)
Buffer Size	8KB	Data Errors	
Platters	4	(non-recoverable)	<1 per 10 <sup>15</sup> bits read
Data Surfaces	8	<b>PERFORMANCE:</b>	
Tracks per Surface	48,000	Seek times	
Track Density	63,100 tpi	Track to Track	
Recording Density	600 Kbp	Read	0.3 ms
Bytes per Sector	512	Write	0.5 ms
Sectors per Track	746	Average	
<b>PHYSICAL:</b>		Read	4.5 ms
Height	26.1mm	Write	5.0 ms
Length	147.0mm	Average Latency	2.99 ms
Width	101.6mm	Rotational Speed	
Weight	600g	(+/-0.20%)	7,200 rpm
Temperature (°C)		<b>Data Transfer Rate:</b>	
Operating	5°C to 55°C	To/from Disk	60MB/Sec
Non-operating/Storage	-40°C to 71°C	To/from Host	320MB/Sec
Relative Humidity	5% to 95%	Start Time	
Acoustic Noise	33dBA, idle	(0 – Drive Ready)	9 sec

Q#2. Define the terms seek time, rotational delay, access time and transfer time (5 Marks)

**Solution to Quiz # 4**  
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Ans 1.

$$\frac{60 \text{ seconds}}{\text{disk rotation speed}} \times \frac{1000 \text{ ms}}{\text{second}}$$

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Rotational delay = [(60 seconds/7200 rpm) \* (1000ms/second)]/2 = 4.16 ms.

Ans 2.

- Seek time is the time it takes for a disk arm to position itself over a requested track.
- Rotational delay is the time that it takes for the required sector to position itself under a read/write head.
- The sum of the rotational delay and seek time is known as the access time.
- If we add to the access time the time that it takes to actually read the data from the disk, we get transfer time.