TUT - 10

1-

1. Using SSTF, start with the closest request:

   - From 80 to 86 (move 6 cylinders).

   - From 86 to 72 (move 14 cylinders).

   - Continue serving requests based on proximity.

2. Total cylinder movement:
   $$X = \text{sum of all movements.}$$

3. Calculate power dissipation:
   $$\text{Power} = X \times 0.2\,\text{mW} + (\text{direction changes}) \times 15\,\text{mW.}$$

Answer: $\text{Total Power} = 215\,\text{mW.}$

2-

1. Rotational latency = $\frac{1}{2} \times$ time for one rotation.

   - One rotation: $60/600\,\text{sec} = 100\,\text{ms.}$

   - Rotational latency: $100/2 = 50\,\text{ms.}$

2. Transfer time for 250 bytes = $\frac{250}{500 \times 100} \times$ time for one sector.

3. Total time = Seek time + Rotational latency + Transfer time.

Answer: 255.5 ms (Option B).

3-

1. Compute total distance for SSTF: Closest request first.

2. Compute total distance for SCAN: Head moves towards 100, reversing after reaching the end.

3. Difference = SSTF distance - SCAN distance.

Answer: 9 tracks (Option B).

4-

1. Sort requests: `[10, 11, 38, 47, 63, 87, 92, 121, 191]`.

2. Start from 63, move upwards to the largest request, wrap around to the smallest, and continue.

Answer: 165 cylinders (Option B).

5-

1. Total capacity:
   $$16 \times 128 \times 256 \times 512 = 256\,\text{MB}.$$

2. Number of sectors:
   $$16 \times 128 \times 256.$$

3. Bits required to address sectors:
   $$\log_2(\text{total sectors}).$$

Answer: 256 MB, 19 bits (Option A).

6-

1. FCFS: Total seek distance $= 170\,\text{ms}$.

2. SSTF: Closest-first seek distance $= 115\,\text{ms}$.

3. SCAN: One direction, then reverse $= 200\,\text{ms}$.

4. LOOK: Like SCAN, but no extra movement $= 180\,\text{ms}$.

9- **Steps:**

1. Serve requests closest to 100 first: `[105, 110, 135, 145]`.

2. Stop when cylinder 90 is reached.

Answer: 3 requests (Option C).

10-

1. Time for one rotation:

$$1/(7200/60) = 8.33 \, \text{ms}.$$

2. Data per rotation:

$$160 \times 512 \, \text{bytes}.$$

3. Transfer rate:

$$\text{Data/rotation} \div \text{Rotation time}.$$

Answer: 9600 KB/s (Option B).