RAID

1.)

RAID 0: Stripe all disks
- Spread the 750 GB equally across all disks
- Efficiency: 100% (75GB/Disk)
  - No Redundancy
- Read access: Faster - All disks read 1 big striped file.
  - 1GB x 8 + 0.5GB x 2 = 9GB/s

RAID 1: Not enough space to store the database.
- DB: 750GN mirrored - 1500GB required. Only 1000 available.

RAID 3:
- Efficiency: 1 Parity disk, 9 striping = 90%
- 750GB/9 = 83.33GB/disk
- Reading: Best: (n-1)x
- Assuming one of the slow disks is dedicated to parity:
  - (1Gbit x 8) + (0.5Gbit x 1) = 8.5Gbit/s

RAID 5:
- Storage Efficiency: 1 - (1/10) = 90%
- 750GB/10 = 75GB/disk
- Read speed: (8 x 1Gbit) + (2 x 0.5Gbit) = 9Gbit/s

RAID 10: Requires min x2 available storage vs database size.
- Available: 1000GB
- Required: 1500GB = Not possible
- Assuming each disk is 100GB we would need 16 disks.

2.)

RAID 4:
- 1 Block
  - Read = 1s
  - Write = 5s
- Disks: 5 + 1 parity

a.) Write data spread over 2 blocks.
- Each block resides on its own. The data is read simultaneously from disks. Parity block is computed and compared is the block stored on the parity disk.
- If the values match, new data is written, parity block is computed again and stored on the parity disk while replacing the old value.

b.) No. each write requires computing and writing the parity values to the parity disk. Only one value can be written at a time.

c.) No. Reading from disks also requires accessing the parity disk to read the parity block.

d.)
- Read 2 blocks + parity block at the same time is 1s.
- Write across 2 blocks + parity block is 5s.
- 1s + 5s = 6s

RIAD 5:

a.) Similar like RAID 4, but the parity block resides on alternating disks.

b.) Yes if the blocks to write are not the same.

c.) Yes if the blocks accessed are different and the parities are stored on different disks.

d. Same as RAID 4 = 6s