VM Questions

1. Changing the number of processors can impact behavior and performance of the VM. Decreasing the processors can reduce the CPU resources for that VM. In a scenario in which conservation of resources or prioritization of other processes is the main concern, such as hosting a low-traffic website, minimizing CPU resources for the VM would be preferred. Setting the processors to the maximum can be useful when the VM is running resource-intensive applications such as hosting high user traffic websites. Setting the number of processors to the maximum could lead to poor performance because CPU wait time goes up due to contention for resources.
2. KVM would be the best to use with Ubuntu Linux because it can be considered native to Linux as the Linux kernel has a KVM module.
    a. None: this disables paravirtualisation.
    b. Legacy: an old virtual machine created by an old hypervisor. The interface will be older but the VM will be 5.0 or newer.
    c. Minimal: the mandatory option for guest Mac OS X.
    d. Hyper-V: the recommended one for Windows Guests. It presents a hypervisor interface recognized by Windows 7 or newer.
    e. KVM: the recommended option for Linux Guests. It presents a hypervisor interface recognized by the linux kernel.
3. Storage Controllers:
    a. IDE: is an older storage controller found in hard drives. It provides functionality is mainly used for compatability purposes.

        i. Use Case: If you have a legacy Virtual Machine that requires compatability with old OS designed for IDE drives (e.g. old Windows), then the IDE controller would eb the best option.
    b. SATA: is a widely used modern storage controller. It has improved flexibility and performance allowing for hot swapping, multiple drives, and improved speeds.
        i. Use Case: General purpose VMs should use type of storage controller.
    c. NVMe: is the most advanced storage controller type available. It is explicitly for solid-state drives and provides incredibly high performance in the form of high speed, low CPU overhead, and parallelism.
        i. Use Case: When running a performance-critical application on the Virtual Machine that require high speed storage like large-scale databases, NVMe controllers should be used.
4. Network Adaptors:
    a. NAT: allows the VM to access the internet by sharing the host computer's IP address and mediates the VM and external network.
        i. Use Case: It would be best to use NAT when browsing th eweb or using online services through VM (meaning no direct interaction with local network devices).
    b. Bridged Adapter: allows the VM to become a part of the local network. It gets its own IP address and can communicate with other network devices.
        i. Use Case: When remote access or file sharing is required, Bridged Adapter would be optimal.

c. Internal Network: creates a private network within the VM and VMs can communicate with each other but are isolated from the external external network and internet.
    i. Use Case: When running multi-tier application in which internal communication is necessary but external connections are not, internet networks are the optimal option.
d. Host-only Network: allows for communication between the VM and the host computer while isolating them from the external network. It is very similar to internal network but instead of VMs communicating, it is the VM and host.
    i. Use Case: This would be best for testing and debugging.

5. The difference between the three controllers for USB Configuration of the VM is that they represent developments in data transfer technoloy. In order from oldest to newest, it is USB 1.1, 2.0, then 3.0. USB 1.1 allows for a 12 Mbps transfer rate. USB 2.0 allows for a 480 Mbps transfer rate. Finally, USB 3.0 allows for a 5 Gbps transfer rate.