(a) Define hardware conflicts and explain how they commonly occur (2 marks)

Definition of hardware conflicts

Hardware conflicts occur when two or more devices in a computer attempt to use the same system resources—such as IRQs, I/O ports, DMA channels, or memory addresses—causing the devices to malfunction or the system to become unstable.

How they commonly occu

- A new expansion card or device is installed and overlaps with existing device resource settings.
- Outdated or incompatible drivers assign incorrect resources.
- Automatic resource allocation (Plug and Play) fails or assigns conflicting settings.

(b) Four common types of hardware conflicts (4 marks)

1. IRQ (Interrupt Request) Conflicts
   Occur when two devices attempt to use the same interrupt line.
2. I/O Address Conflicts
   Happen when devices are assigned overlapping input/output port addresses.
3. Memory Address Conflicts
   Arise when two devices share the same memory range or address space.
4. Driver Conflicts
   Result from incompatible, outdated, or incorrect drivers that cause devices not to respond or misbehave.

(c) Tools a technician should use to identify and diagnose hardware conflicts (1 mark)

- Device Manager — Shows device status, conflicts, warnings, and resource usage.
  Other helpful tools include Event Viewer and System Information, but Device Manager is the primary one.

(d) Three corrective actions to resolve hardware conflicts and ensure proper device functionality (3 marks)

1. Update or Reinstall Device Drivers
   Ensures devices receive correct instructions and proper resource allocation.
2. Manually Reassign Resources (IRQ, I/O, Memory)
   Adjust resource settings in Device Manager or BIOS/UEFI to prevent overlapping assignments.
3. Move or Replace the Expansion Card/Device
   Physically moving the card to a different slot prompts the system to reassign resources, or replacing faulty hardware removes the conflict completely.