Chapter 10 – Troubleshooting Basic I/O Interface Card and Surface Mount PCB

✅ Part I: Short Questions

Q1. Write a short note on parallel port.

- A **parallel port** is used to transfer multiple bits simultaneously.
- Commonly used for printers (DB-25 connector).
- Slow compared to USB, now obsolete.

Q2. Write a short note on serial port.

- A **serial port** transfers data one bit at a time.
- Used for old mice, modems, and communication devices.
- Connector type: DB-9.

Q3. Write a short note on PS/2 port.

- Round **6-pin connector** used for mouse and keyboard.
- Color-coded: Purple (keyboard), Green (mouse).
- Replaced by USB in modern PCs.

Q4. Write a short note on USB port.

- **Universal Serial Bus** supports plug-and-play and hot swapping.
- Used for keyboards, mice, storage devices, and charging.
- Versions: USB 2.0, 3.0, 3.1, USB-C.

Q5. Write a short note on VGA port.

- **Video Graphics Array (15-pin D-sub connector)**.
- Transfers analog video signals to monitors.
- Largely replaced by HDMI and DisplayPort.

Q6. Write a short note on Modem port.

- Also called **RJ-11 port**.
- Used to connect computers to telephone lines for dial-up internet.
- Now rarely used due to broadband/DSL.

Q7. Write a short note on Ethernet port.

- **RJ-45 port** used for wired LAN connections.
- Provides high-speed networking (10/100/1000 Mbps).
- Still widely used in PCs, servers, and routers.

Q8. What do you know about Soldering Iron?

- A hand tool used to heat and melt solder.
- Helps join electronic components on PCB.

Q9. Explain soldering station.

- A complete unit with **temperature-controlled soldering iron, holder, and cleaning sponge**.
- More precise than a basic soldering iron.

Q10. Define soldering paste.

- A flux-based paste that improves solder flow and prevents oxidation during soldering.

Q11. Write a short note on Soldering Wick.

- A copper braid used to **remove excess solder** from joints.
- Works by capillary action when heated.

Q12. How soldering sucker works?

- A spring-loaded device used to suck up melted solder when desoldering components.

Q13. Explain tweezer set.

- Precision tweezers used to handle small Surface-Mount Devices (SMDs) during repair.

Q14. How to check short circuiting of IC.

- Use a **multimeter in continuity mode**.
- If input and output pins show direct continuity (beep), IC may be shorted.

Q15. How to test IC temperature.

- Use an **infrared thermometer or thermal camera**.
- Overheating IC indicates internal short or overload.

✅ **Part II: Long Questions**

Q1. How to create I/O card?

- Design PCB layout for desired ports (USB, parallel, serial).
- Place interface chips and connectors.
- Solder components properly.
- Test card in PC expansion slot (e.g., PCI/PCIe).

Q2. What are the different ways to diagnose fault and repair?

1. **Visual inspection** – look for burnt/damaged parts.
2. **Multimeter test** – check continuity, voltage, resistance.
3. **Oscilloscope test** – check signal waveforms.
4. **Card substitution** – replace suspected faulty card with known good one.
5. **Reflow/re-solder** – fix cold or cracked solder joints.

Q3. Discuss in detail about the soldering equipment.

- **Soldering iron:** Heats solder for joining.
- **Soldering station:** Precise temperature control.
- **Desoldering pump:** Removes solder.
- **Soldering wick:** Absorbs excess solder.
- **Tweezers:** Handle small SMDs.
- **Magnifier lamp:** For precision work.

Q4. What do you know about soldering tools? Explain.

- **Tools used in PCB repair:**
    1. Soldering iron/station.
    2. Flux & solder wire.
    3. Desoldering pump & wick.
    4. Tweezers & magnifiers.
    5. Multimeter for testing connections.

Q5. Explain all the soldering accessories you know.

- **Solder wire:** Tin-lead or lead-free wire.
- **Flux:** Prevents oxidation and ensures smooth joints.
- **Cleaning sponge/brass wool:** Cleans soldering tip.
- **Tip cleaner:** Restores worn soldering tips.
- **PCB holder/stand:** Holds circuit board securely.

Q6. Discuss in detail faults for SMD troubleshooting.

1. **Cold solder joints:** Poor heating causes weak connections.
2. **Bridging faults:** Excess solder connects two adjacent pads.
3. **Lifted pads:** Overheating damages PCB traces.
4. **Short circuits:** Caused by improper soldering or damaged IC.

5. **Open circuits:** Broken connections due to cracks.
6. **Component failure:** Overheating during soldering damages sensitive ICs.

🌟 Extra Important Questions

Q1. Difference between through-hole and SMD components?

- **Through-hole:** Pins inserted into drilled holes, strong but bulky.
- **SMD:** Mounted on surface, smaller, used in modern electronics.

Q2. What safety precautions should be followed while soldering?

- Work in a ventilated area.
- Wear safety glasses.
- Use antistatic wrist strap.
- Avoid inhaling fumes.
- Disconnect power before repair.

Q3. What is reflow soldering?

- A process where solder paste is melted in a controlled oven to mount SMDs.

Q4. Common signs of faulty I/O interface card.

- Ports not detected.
- Devices not working despite drivers installed.
- Burn marks or overheating.

Q5. Difference between USB and Serial ports?

- USB: Faster, supports plug-and-play, modern standard.
- Serial: Older, slower, used for legacy devices.