Chapter 7 – Maintenance and Repair of Display Devices

✅ Part I: Short Questions

Q1. Define pixels, dot pitch, aspect ratio, power indicator, contrast, brightness, -/+ buttons, and other adjustment buttons.

- **Pixels:** Smallest unit of an image displayed on the screen.
- **Dot pitch:** Distance between two same-colored pixels (smaller = sharper).
- **Aspect ratio:** Ratio of width to height (e.g., 16:9, 4:3).
- **Power indicator:** LED that shows ON/OFF status.
- **Contrast:** Difference between the lightest and darkest parts of display.
- **Brightness:** Overall light intensity of the display.
- **–/+ buttons:** Used to adjust settings like brightness, contrast, position, and volume.
- **Other adjustment buttons:** Menu, auto-adjust, color control.

Q2. Differentiate color monitor diagram from monochrome monitor diagram.

- **Color Monitor:** Uses three electron guns (RGB – Red, Green, Blue) → produces millions of colors.
- **Monochrome Monitor:** Uses a single electron gun → displays only one color (usually green, amber, or white on black).

Q3. Enumerate common faults of a monitor.

1. No display (black screen).
2. Distorted/blurred images.
3. Flickering screen.
4. Dead/stuck pixels.
5. Color distortion.
6. Power LED blinking but no display.

Q4. Diagnose common monitor faults.

- Check power cable and signal cable.
- Test with another PC/monitor.
- Adjust brightness/contrast.
- Inspect for backlight or inverter faults.
- Use diagnostic software for dead pixels.

Q5. Diagnose monitor interface card fault.

- No display despite working monitor.
- Display driver errors.
- Artifacts (lines, patterns) on screen.

- Overheating GPU chip.
- Fault isolated by replacing interface card (graphics card).

✅ **Part II: Long Questions**

Q1. Describe horizontal position/size, vertical position/size, 15-Pin D-Subtype connector, non-glare screen, tinted screen, and tilt/swivel stand.

- **Horizontal position/size:** Adjusts left-right placement and width of display.
- **Vertical position/size:** Adjusts up-down placement and height of display.
- **15-Pin D-Subtype connector (VGA):** Standard analog video connector.
- **Non-glare screen:** Reduces reflections for eye comfort.
- **Tinted screen:** Enhances contrast and reduces brightness.
- **Tilt/swivel stand:** Allows monitor adjustment for user comfort.

Q2. Describe video controller chip, video RAM, video image chip, digital-to-analog converter, port to monitor, signal assignment, factory preset timing signals.

- **Video controller chip (GPU):** Manages display processing.
- **Video RAM (VRAM):** Stores image/frame buffer.
- **Video image chip:** Converts data into display signals.
- **DAC (Digital-to-Analog Converter):** Converts digital data into analog signals (for VGA).
- **Port to monitor:** Connector (VGA, DVI, HDMI, DisplayPort).
- **Signal assignment:** Defines pin-out functions (sync, color, ground).
- **Factory preset timing signals:** Predefined refresh rates/resolutions (e.g., 60Hz, 75Hz).

Q3. Describe display adapters: MDA, CGA, EGA, VGA, SVGA, XGA, 8514.

- **MDA (Monochrome Display Adapter):** Text only, no graphics.
- **CGA (Color Graphics Adapter):** Basic color graphics (up to 16 colors).
- **EGA (Enhanced Graphics Adapter):** Higher resolution, 64 colors.
- **VGA (Video Graphics Array):** 640x480 resolution, 256 colors.
- **SVGA (Super VGA):** Higher resolution (800x600 to 1600x1200).
- **XGA (Extended Graphics Array):** 1024x768 resolution.
- **8514:** IBM standard, 1024x768 resolution, early 2D accelerator.

Q4. Classify various faults.

- **Power Supply-based faults:** Monitor not turning on, LED off.
- **Deflection faults:** Distorted/curved image.
- **Horizontal hold faults:** Image rolling left-right.
- **Vertical hold faults:** Image rolling up-down.

- **Alignment faults:** Misaligned colors/picture geometry.
- **Supply line faults:** Loose or broken power/data cables.
- **Interface-based faults:** Graphics card or port problems.

Q5. Describe preventive measures for monitors.

- Keep monitor dust-free.
- Use surge protectors/UPS.
- Maintain proper ventilation.
- Adjust brightness to avoid burn-in.
- Avoid strong magnets near CRT monitors.
- Use energy-saving mode.

🌟 **Extra Important Questions**

Q1. Difference between CRT and LCD monitors?

- **CRT:** Bulky, electron gun, prone to flicker, consumes more power.
- **LCD/LED:** Thin, flat, energy efficient, sharp display.

Q2. What is refresh rate?

- Number of times per second the screen redraws an image (Hz). Higher = smoother display.

Q3. What is response time?

- Time taken for a pixel to change from one color to another (ms). Lower = better performance.

Q4. Why do dead pixels occur?

- Manufacturing defect or damage to TFT matrix in LCDs.

Q5. What safety precautions should be taken when repairing CRT monitors?

- Discharge high voltage before repair.
- Avoid touching flyback transformer.
- Use insulated tools.