

✔ **Part I: Short Questions**

**Q1. What is a computer power supply?**

- A **Power Supply Unit (PSU)** converts **AC (Alternating Current)** from mains electricity into **DC (Direct Current)** required by computer components.
  - Example: ATX Power Supply.
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**Q2. What are the main components of a computer power supply?**

1. Transformer – steps down voltage.
  2. Rectifier – converts AC to DC.
  3. Filter capacitors – smooth DC output.
  4. Voltage regulators – provide stable voltage levels.
  5. Cooling fan – prevents overheating.
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**Q3. What is the difference between a 20-pin and a 24-pin power supply connector?**

- **20-pin connector:** Older ATX standard, supports basic motherboards.
  - **24-pin connector:** Modern ATX standard, provides extra power for CPUs, GPUs, and peripherals.
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**Q4. Describe regulation of power supply.**

- Regulation means **maintaining a constant output voltage** despite variations in input voltage or load conditions.
  - Example: 5V line remains stable at 5V even if load changes.
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**Q5. Draw block diagram or schematics of power supply.**

(Explainable in exams – a typical block diagram includes)

AC Input → Transformer → Rectifier → Filter → Voltage Regulator → DC Output

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**Q6. Describe battery type power supply.**

- Uses batteries (DC) instead of AC mains.
  - Example: Laptop batteries, UPS (Uninterruptible Power Supply).
  - Provides backup during power outages.
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**Q7. Determine different output voltages of power supply.**

- Common ATX PSU output voltages:
    - +3.3V (chipsets, memory)
    - +5V (logic circuits, USB devices)
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- +12V (CPU, GPU, fans, drives)
- -12V (older serial ports)
- +5VSB (standby power)

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#### Q8. Test good signal power supply.

- **Power Good (PG) Signal:** Sent by PSU to motherboard when voltages are stable.
- Can be tested using a **multimeter or POST diagnostic card**.

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#### Q9. Identify commonly occurring faults of power supply.

1. No power (dead PSU).
2. System restarts randomly.
3. Overheating or noisy fan.
4. Burnt smell or capacitors leaking.
5. Incorrect voltage output.

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#### Q10. List essential tools and test equipment.

- Digital multimeter.
- Power supply tester.
- POST diagnostic card.
- Screwdriver set.
- Antistatic wrist strap.
- Soldering iron (for repairs).

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### ✔ Part II: Long Questions

#### Q1. Explain operating principle of power supply.

- Converts **AC (220V/110V)** to required **DC voltages** for system.
- **Steps:**
  1. AC Input → Transformer lowers voltage.
  2. Rectifier → Converts AC to DC.
  3. Filter → Smoothens DC.
  4. Voltage Regulator → Maintains stable output.
  5. Output distributed to motherboard, drives, GPU.

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#### Q2. Describe switch mode and transformer-based unit of power supply.

- **Transformer-based PSU:**
  - Heavy, uses linear transformers.

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- Less efficient, produces heat.
  - **Switch Mode Power Supply (SMPS):**
    - Lightweight, uses high-frequency switching.
    - More efficient, compact, and widely used in PCs.
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#### Q3. Explain block diagram of a switching power supply.

1. AC Input → Rectifier & Filter (converts to DC).
  2. High-frequency inverter (switching transistors).
  3. Transformer (isolates and steps voltage).
  4. Secondary Rectifier → Filter → Regulator.
  5. Final DC Output → Motherboard/Components.
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#### Q4. Explain how a power good signal is produced.

- PSU monitors output voltages.
  - If voltages are stable, it sends a **Power Good signal** (~5V) to motherboard.
  - Motherboard then starts the boot process.
  - If unstable, no signal → system won't boot.
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#### Q5. Explain troubleshooting procedures of power supply.

1. Check AC input and cables.
  2. Use **power supply tester/multimeter** to verify voltages.
  3. Inspect capacitors for bulging or leaks.
  4. Check fan operation (overheating issue).
  5. Replace PSU with a known good unit for verification.
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#### Q6. Explain causes of faults in power supply itself.

1. Dust accumulation → overheating.
  2. Power surges → damaged components.
  3. Aging capacitors → voltage drops.
  4. Overloading → PSU shutdown.
  5. Faulty fan → heat damage.
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#### Q7. Describe various repairing techniques.

- Clean PSU internally (remove dust).
- Replace blown capacitors and fuses.
- Resolder loose joints.

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- Replace faulty fan.
  - Test with diagnostic card after repair.
  - If major fault persists → replace PSU.
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### ✦ Extra Important Questions

#### Q1. What is the difference between AT and ATX power supply?

- AT: Old standard, large connectors.
- ATX: Modern, 20/24 pin connectors, supports standby power.

#### Q2. What is UPS and its types?

- **Uninterruptible Power Supply** – provides backup power.
- Types: Offline UPS, Line-interactive UPS, Online UPS.

#### Q3. What safety precautions should be taken when repairing PSU?

- Disconnect from mains before opening.
- Discharge capacitors (can store high voltage).
- Use insulated tools and antistatic strap.

#### Q4. Why is cooling important in power supply?

- Prevents overheating, ensures efficiency, and prolongs PSU life.

#### Q5. What is the difference between linear PSU and SMPS?

- Linear: Heavy, less efficient.
- SMPS: Lightweight, efficient, widely used in PCs.