ICT Examination Cheat Sheet: Key Units and Exam Focus

Unit C1: ICT Fundamentals and Application [510–530]

Concept	Key Definitions/Focus Areas (High Priority)	Exam Application Focus (MCQ/Essay)
Information Quality	Timely, Accurate, Contextual, Understandable, Reduces Uncertainty	Describe characteristics of valuable information
Data Processing Modes	Batch: Jobs grouped and processed together (e.g., monthly payroll, utility bills, file backup). Real-time: Immediate response required (e.g., ATM updates, air traffic control, ICU monitoring).	Differentiate between Batch and Real-time systems
Data Validation	Presence Check (data exists), Range Check (data within bounds), Data Type Check (correct format)	Identify suitable validation checks
Data Input Devices	Direct Entry devices (e.g., Barcode Reader) minimize time/errors	Identify suitable hardware for efficiency (e.g., Barcode Technology)
Societal Impact	Digital Divide; Security Issues: Phishing (fake trustworthy identity to get info), Software Piracy (illegal copying/distribution)	Define Phishing; Open-source vs Proprietary software

Units C2, C3, C4: Architecture, Data Representation, and Logic [530–557] (MCQ Q1–15)

C2: Architecture & Memory

- **Memory Hierarchy**: Registers → L1 Cache → L2 Cache → Main Memory → Hard Disk (fastest to slowest, smallest to largest capacity)
- **Volatile Memory**: Registers, Cache, RAM lose data when power is off
- **CPU Cycle**: Fetch–Decode–Execute, controlled by the Control Unit
- **MMU (Memory Management Unit)**: Maps virtual addresses to physical addresses

Exam Focus: Identify fastest memory, order hierarchy, identify volatile memory, MMU functions

C3: Data Representation

- **2's Complement**: For subtraction and negative numbers
- **Binary Arithmetic**: AND, OR, XOR operations

Exam Focus: Convert decimals to 2's complement, perform bitwise operations

C4: Logic Design

- **Boolean Simplification**: Use Boolean laws or K-maps for SOP/POS
- **Sequential Circuits**: Flip-flops (store 1 bit), Half/Full Adders (CPU building blocks)

Exam Focus: Simplify Boolean expressions, identify flip-flops

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Unit C5: Operating Systems [557–567] (MCQ Q16–30, Structured Essay Q4)

- **Process States**: New → Ready ↔ Running ↔ Blocked → Terminated
- **Time Slice**: Running → Ready
- **Blocked**: Waiting for I/O/resources
- **PCB (Process Control Block)**: Stores process state, Program Counter, registers, memory info, process ID
- **Context Switching**: Saving/loading register values
- **Virtual Memory/Paging**: Uses page tables for mapping addresses
- **File Allocation**: Linked (pointers), Contiguous (adjacent blocks), Indexed

Exam Focus: Identify states, PCB contents, address calculations, file allocation types

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Unit C6: Networking and Protocols [568–591] (MCQ Q16–30, Essay Q2/Q6)

- **TCP/IP Layers**:
    - Transport: TCP (reliable), UDP (fast, connectionless)
    - Network: Routing, logical addressing (IP)
- **Protocols**: DNS (maps hostnames to IP), DHCP (dynamic IP assignment)
- **Addressing**: IPv4 = 32 bits, MAC = 48 bits (hexadecimal)
- **Subnetting**: Borrowed bits → subnet mask, usable IP range
- **Network Security**: Firewall, Proxy Server, Asymmetric Encryption (public/private keys)
- **Topology**: Star (central hub/switch), Mesh (high connectivity, inefficient for large networks)

Exam Focus: TCP vs UDP, DNS role, subnet masks, security mechanisms, draw topologies

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Unit C7: Systems Analysis & Design (SDLC) [591–612] (MCQ Q31–48, Essay Q4/Q6)

- **Requirements**:
    - Functional (tasks/behaviors)
    - Non-functional (performance, security, constraints)
- **SDLC Models**: Waterfall, Agile, Spiral
- **Feasibility**: Technical, Economic, Operational
- **Testing**: Unit → Integration → System → Acceptance (user sign-off, black-box)
- **Deployment**: Parallel (safe, costly), Direct (risky), Pilot (small group)
- **DFD Components**: Entities, Processes, Data Stores, Data Flows

Exam Focus: Requirement types, choose model, feasibility type, testing order, deployment risk/cost, DFD rules

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Unit C8: Database Systems [612–627] (MCQ Q31–48, Essay Q5/Q9)

- **Attributes**:
    - Multivalued (multiple values, e.g., phone numbers)
    - Composite (e.g., Name → First, Last)
    - Derived (e.g., Age from DOB)
- **Normalization**:
    - 1NF (remove repeating groups)
    - 2NF (remove partial dependency)
    - 3NF (remove transitive dependency)
- **SQL**:
    - DML: SELECT, INSERT, UPDATE, DELETE
    - DDL: CREATE, DROP, ALTER
    - Constraints: PRIMARY KEY, FOREIGN KEY, CHECK

Exam Focus: Attribute types, normalization steps, SQL queries

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Unit C9: Programming & Algorithms (Python) [627–644] (MCQ Q31–48, Essay Q4/Q8)

- **Algorithms**: Flowcharts, Pseudocode, Hand Tracing
- **Control Structures**: Nested loops, if/elif/else, break/continue
- **Functions**: Parameters, scope, return values
- **Data Structures**:
    - Mutable: Lists, Dictionaries
    - Immutable: Strings, Tuples
- **File Handling**: open, read, write, close, loop line-by-line

Exam Focus: Trace loops, write functions, predict mutability errors, file handling scripts

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Unit C10: Web Technologies (HTML, CSS, PHP) [644–658] (MCQ Q40–48, Structured Essay Q1)

- **HTML Forms**: method="POST" or "GET", action="process.php"
- **Tables**: rowspan, colspan
- **Links**: Internal (), External ()
- **CSS**: External (best for multiple pages), Selectors: .class, #id, group selector
- **PHP**: Variables ($), Form data ($_POST, $_GET), Database connection (mysqli_connect/new mysqli)

Exam Focus: Complete HTML forms, hyperlinks, external CSS, PHP connection blocks

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Units C11, C12, C13: Emerging Trends & Business [658–673] (MCQ Q49–50, Essay Q7)

C12: E-commerce

- **Transaction Types**: B2C, B2B, C2C, G2C
- **Models**: Pure Brick, Brick and Click, Pure Click
- **Revenue**: Sales, Subscription
- **Mechanisms**: Payment Gateway, Online Marketplace, Reverse Auction

C13: AI/Agents/Future

- **AI**: Bio-inspired (evolution, neural function), Generative AI, Expert Systems (knowledge base + inference engine)
- **Agents**: Autonomous, Cooperative; User Agent (chatbot), Self-Autonomous Agent (search agent)

C11: IoT/Embedded

- **IoT**: Interconnected devices with sensors/actuators
- **Microcontrollers**: Arduino, Raspberry Pi
- **Sensors**: Detect environmental changes

Exam Focus: Transaction types, feasibility of models, Payment Gateway, bio-inspired computing, IoT concepts

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