COMPUTER HARDWARE AND GSM REPAIRS

PREAMBLE

This syllabus is designed to assess candidates' basic skills of maintenance of mobile phones, in terms of knowledge and competence in fault finding and systematic repairs. It also assesses candidates' knowledge of setting up and managing a mobile phone maintenance and repair enterprise.

AIMS AND OBJECTIVES

The aims and objectives of the syllabus are to test candidates' knowledge and understanding of:

1. Basic concept and terminologies
2. Tracing, testing, troubleshooting, maintenance and repairs of mobile phones
3. Analysing mobile phone PCB circuits
4. Different fault finding techniques
5. Using internet resources, data manuals, service manuals and troubleshooting manuals
6. General safety precautions in mobile phone repair and maintenance
7. The requirement for setting up and successfully running a mobile phone maintenance and repair business

SCHEME OF EXAMINATION

There will be two papers - Paper 1 and Paper 2. The papers shall be a composite paper to be taken at one sitting.

PAPER 1: Objective Test - 45 minutes.

PAPER 2: Will consist of two sections, Sections A and B. The latest WAEC timetable lists Paper 2 (Essay) as 1 hour 35 minutes.

Section A will comprise twelve essay questions. Candidates will be required to answer any ten of them for a total of 60 marks.

Section B will comprise two questions on test of practical work. Candidates will be required to answer both questions for 40 marks.

NOTE: Current paper durations have been aligned with the latest WAEC timetable available for the subject.

DETAILED SYLLABUS

CONTENT	NOTES
A. INTRODUCTION TO MOBILE PHONES AND SERVICE PROVIDERS	
1. Mobile phones acronyms and terminologies	Definition of mobile phones and its terminologies Terminologies should include GSM, CDMA, mobile phones/cell phones/user equipment, MMS, SMS, call barring, call forwarding, BSI, DCT, FPS etc.
2. Mobile phone bands and their uses	Band—single, double, tri and quad bands and their uses.
3. Types of mobile phones	Mobile phone types—straight, flip, slides etc. and their special maintenance needs.
4. Phone accessories and their functions	All phone accessories including; headsets/hands free, earpiece, external Bluetooth, batteries, chargers, cables etc. and their functions.
5. Types of menus and sub-menus	Menus and sub-menus including; phone book, message, call, settings, applications etc. and their functions
6. Service providers and their codes	Major voice service providers and their service codes.
B. BASIC COMPUTER AND INTERNET CONCEPTS.	
1. Introduction to computer	Definition, identification and functions of various computer hardware (monitor, CPU,

	keyboard etc.) and software (operating and application) components.
2. Introduction to internet	Web access platform Including; WAP/GPRS/EDGE/Wi-Fi/3G etc.
3. Browsing the web	Browsing activities like downloading, uploading etc.
C. ESSENTIAL COMPONENTS OF MOBILE PHONES AND THEIR FUNCTIONS	
1. Structure of mobile phones	Basic block diagram (power unit, memory unit and radio unit) and functions of each block.
2. Hardware components	Identification, description and functions of various hardware components including CPU, SIM socket, earpiece, keypad, buzzer, vibrator etc.
3. Software components	Various software components both operating and application software.
D. MAINTENANCE AND REPAIR OF MOBILE PHONES	
1 Electronic components in mobile phones	Resistors, capacitors, diodes, transistors, IC, etc.
2 Preventive maintenance 3 Corrective maintenance	Definitions, functions, reason, advantages and procedures (cleaning, soldering, de-soldering, re-balling etc.) of preventive and corrective maintenance
4 Common tools and equipment for	Identify common tools and equipment for

hardware and software repairs.	hardware repairs such as; star, Allen key, lead, precision set, multimeter, oscilloscope, computer set soldering iron and sucker etc. and their uses. Identify common software tools for repair such as; unlocking software, flashing software firmware installation etc.
5 Safety in mobile phone workshop	List safety rules and regulations. Safe use of maintenance tools. Basic safety facilities in the mobile phone workshop (first aid box, fire extinguishers etc.)
6 Common hardware problems	Identification of hardware problems such as damaged screen, charging ports, mouthpiece, earpiece, keyboard etc.
7 Common software problems	Identification of software problems such as; 'contact service provider', 'phone lock code', 'invalid SIM', 'SIM card rejected' etc.
E. TROUBLE-SHOOTING	
1. Basic troubleshooting	Disassembling and assembling, testing and troubleshooting of components such as displays, speakers, vibrators, ringers, charging ports, charging jacks, batteries, keypads, panels etc. Troubleshooting/fault finding using relevant mobile phone menus. Identification of mobile phone ICs and electronic components. Reading of PCB circuit layout and schematic diagrams.

2. Tracing and fault finding in hardware	Identification of faulty components (using visuals, continuity test, open circuit, short circuit etc.) Test voltages on PCB (voltage levels at various points and voltage specification of IC pins) Troubleshooting techniques—metering methods, signal tracing/injection, component testing, visual inspections etc. Troubleshooting Surface Mount Devices (SMD)/ Ball Grid Array (BGA) etc.
3. Fault finding in software	Use of software codes for faults finding. Fault find related to software (SIM locked, SIM rejected, hanging problem, restart problem etc.) Flashing of mobile phones—flashing devices, flashing software and their uses Phone lock/security unlocking/resetting counters
F. SETTING UP AND MANAGING MOBILE PHONE WORKSHOP	
1. Setting up a mobile phone workshop	Capital, personnel and factors determining choice of location
2. Facilities/equipment for mobile phone workshop.	Identify appropriate facilities/equipment for a mobile phone workshop.
3. Managing a mobile phone business	Risk analyses, costing, return on investment etc.

SUPERVISED APPRENTICESHIP (INDUSTRIAL TRAINING)

Candidates are required to spend a minimum cumulative total of eight weeks of apprenticeship in an accredited repair and maintenance centre.

LIST OF MINIMUM ITEMS OF EQUIPMENT FOR A CLASS OF FIFTY CANDIDATES

ITEM NO	EQUIPMENT	QUANTITY REQUIRED	QUANTITY SEEN
1	Scrap mobile phone/Mobile phone parts	10	
2	Mobile phone manuals	10	
3	Mobile phone	50	
4	Chart of service codes	1	
5	Phone accessories (various types)	25	
6	Data cable (various types)	25	
7	Oscilloscope	2	
8	Multimeter (analog/digital)	10	
9.	Brush	25	
10	Soldering iron	10	
11.	Safety chart	1	

12.	Hammer	25	
13.	Spanner (various types)	25	
14.	Tweezer	10	
15.	PCB board holder	25	
16.	Cutter	25	
17.	Magnifying desk lamp	10	
18.	Ultrasonic cleaner	1	
19.	Re-balling kits (Chat)	05	
20.	Flashing and unlocking devices	02	
21.	Cables and wires	Assorted	
22.	DC regulated power supply	02	