

100 – LIGHT VEHICLE BODY REPAIR WORK

EXAMINATION STRUCTURE

The trade consists of the following trade related courses:

191 – Metal Work (CME 11 – 14)

193 – Building/Engineering Drawing (CTD 11 – 14)

The trade will also be examined under the following components or subjects groupings:

1. Gas Welding, Cutting & Arc Welding (CEM 12 & 13) – see Fabrication and Welding
2. Body Repair work (CVR 11)
3. Vehicle Body Building (Wood and Metal)
4. Spray Painting, Lining Sign and Design (CPD 15) – Optional (see Painting and Decoration)

EXAMINATION SCHEME

101 – Body Repair Work

This subject grouping consists of two papers:

101-1 – PAPER I : This will consist of two sections, viz:

SECTION A: OBJECTIVE: this will be forty (40) multiple choice questions.

Candidates will be required to answer all in 40 minutes. This section carries forty (40) marks.

SECTION B: ESSAY: this will be a written paper of seven questions. Candidates are to answer five questions in 2½ hours. This Section carries sixty (60) marks.

101-2 PAPER II: PRACTICAL: This test is for four (4) hours and it carries 100 marks. This paper will be released to the candidates ONE WEEK before the examination date. It is the same paper for 091-2.

101 – BODY REPAIR WORK (CVR 11)

S/N	TOPICS/OBJECTIVE	CONTENT	ACTIVITIES/REMARK
1.	<p><u>Safety in Body Repair Shop</u></p> <ol style="list-style-type: none"> Explaining the responsibilities of the employers and employees on safety and identify potential sources of accidents. Identifying first aid equipment, undertake the application of the safety equipment and wears. Cite clauses of Factory Act and draft safety rules and regulations. 	<ol style="list-style-type: none"> Responsibilities of employers and employees: <ol style="list-style-type: none"> Training workers. Organise the seminars and workshops. a) Sources of accidents: <ol style="list-style-type: none"> Faulty electrical circuits and equipment Toxic and inflammable substances. Untidy shop Wrong use of machinery and equipment. Faulty machinery. b) Prevention – keep to all safety rules in workshop First aid equipment – fire fighters, fire extinguishers, switch gear. First aid application in case of minor and severe cuts; electric shock, contact with irritants, burns etc – Artificial respiration, use of cold compress, dressing, tourniquet etc. Safety equipment and wears – overall, goggles, gloves, hard shoes, fire extinguishers etc. Factory Acts – Uniform, workshop sizes, machine instructions. Safety drafts in body repair shop. 	<ol style="list-style-type: none"> Safety practice in the repair workshop. Apply and practice of first aid equipment. Show film on the safety instruction in vehicle repairs factories. Explanation on the Factory Acts.
2.	<p><u>Body Repair Tools and Equipment</u></p> <ol style="list-style-type: none"> Identify and state the functions of hand tools and explain the working principles of basic machines. Identify state the function and explain the working principles of basic equipment with safety requirements. Prepare a set of templates for use. 	<ol style="list-style-type: none"> Identification of hand tools – hammers, (bumping, blocking, pick, shrinking), dollies, spoons, mallet (round and bossing), body bumping files, twisting wrenches, power-operated hand tools. Working principles of machines – guillotines, nibblers, rollers, swaging, folding flanging. Identification and working principles of basic equipment: <ol style="list-style-type: none"> push and pull dozers, pull post, hydraulic body jacks, jigs etc. Templates - develop, draw and cut. 	<ol style="list-style-type: none"> Use of hand tools and machines in the repair of vehicle body. Exercise on the equipment for push pull dozers, pull post, hydraulic body jacks etc. Make the drawing and cutting on the machines.
3.	<p><u>Body Materials</u></p> <ol style="list-style-type: none"> Distinguish between ferrous and non-ferrous metal Identify different types of ferrous metal. Define, the term ‘alloys’ and list them and other non-ferrous metal. 	<ol style="list-style-type: none"> Difference in metals – ferrous and non-ferrous Content of carbon and composition. Identification of types of ferrous metal: The composition, properties and their uses e.g. iron, carbon etc. Alloys e.g. aluminium alloys, chrome, bronze etc. Identification of metal and its properties e.g. fusibility, conductivity, resistance to 	<ol style="list-style-type: none"> Practical on alloys, ferrous metal, types welding and fittings. Work on heat-treatment. Work on heat-treatment. Finishing terms. Exercise on glass fibres.

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	4. Identify metal used in the construction of various types of car bodies and explain heat treatment. 5. Identify common types of body fillers and its terms and explain the function of the operations, composition properties and application. 6. State the basic composition of glass fibre reinforced plastic and explain its application in body repair.	corrosion etc. 6. Heat treatment – working hardening, hardening, tempering etc. 7. Terms: sealing, stopping and filling. 8. The function and the types and body fillers, sealers, stoppers, adhesives, etc. 9. Basic composition of reinforced materials. 10. Application in body repair and plastic areas.	
4.	<u>Car Body Sub-Assemblies and Components</u> 1. Describe the developing of modern motor car body and identify pressed body subassemblies, their functions and methods of assembly. 2. Identify parts in sub-assemblies, their relative locations and functions and interpret the manufacturers hand book for body components interiors. 3. Identify body hardware. Explain their operational and methods of installation.	1. The development of modern motor car body e.g. composite and integral body construction, Peugeot series, Datsun series, Toyota series, Honda series, Ford series, Volvo, Mercedes, Citroen, Volks Wagon series. 2. Pressings: gills, frames, sub-frames and pillars, fenders, scuttle, bonnet, panels (roofs, door side) bumper floor etc. 3. Parts in sub-assemblies: roofs, doors and sides; bonnet, panels etc. 4. Use of hand books in the identification of the parts. 5. Hardwares and methods of installation e.g. door and boot hinges check arms, fittings, locks, locking bars, hinges etc.	1. Practice on motor car body. 2. Prepare complete parts list of body components. Use of hand tools for the repairs. 3. Use the correct tools and equipment to dismantle and install/assemble any body component.
5.	<u>Body Repair Process Repair Estimate</u> 1. Explain the nature of legal or contractual relationship between the customer, vehicle insurer and repair regarding repair of damage. 2. Identify the basic elements of effective customer relationship regarding body repairs and inspect and assess the nature and extent of damage.	1. Legal relationship – sign contract: vehicle insure and laws in repair damage due to accident. 2. Identification of the repair jobs to be carried out, cost of labour input, replacements, write-off cases and extent of damage in terms of repair. 3. Prepare customer’s material list and cost them. 4. Preliminary preparation of cost estimate of materials and parts including other forms of materials purchased.	1. Invite the police officer to deliver lectures on accident laws. 2. Activities of items to be carried out in dismantles of the damage parts. 3. Prepare detailed analysis of parts/components to be repaired and/or replaced and other materials to be used in repair operations. 4. Use manufacturer’s manual and parts dealers dealer’s current price list. 5. Use manufacturer’s manual and parts dealer’s current price list.
6.	<u>Body Repair Process: Repair Procedures and Method</u> 1. Plan repair operation	1. Preparation of plan charts organisation charts and schedules of works. 2. Remove and replace body sub-assemblies	1. Exercises of organisational charts and use it in their shop.

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	<p>sequence and organise the workshop for repair operations</p> <ol style="list-style-type: none"> Remove and dismantle and replace body sub-assemblies and service and install body hardware. Explain and state the removal and installation of side glass, windscreen and back light, and reshape moderately damage side frame. Explain the nature of damage to the chassis frame and replace severely damaged roof panel and centre pillar by cutting and welding techniques. Describe how to set up and apply the damage doxers and use the plumb-bob and methods in checking frame alignment. 	<p>of a variety of cars in Nigeria e.g. Volkswagen, Peugeot, Toyota, Volvo etc.</p> <ol style="list-style-type: none"> Service and install body hardwares and furniture e.g. Clocks, doors, boot lid, planishing, throwing, tucking, sanding, contour correction by use of soft solder and template, roughing out flanging. Damage to the chassis frame or structure of the monocoque body: <ol style="list-style-type: none"> sag sway kick-up or down diamond or lozenge effect twist. Set up an application using the damage doxers, body press, hydraulic body jack etc. In restoring the classes of damage to outer shell; winds, bottom sills, door panels etc. 	<ol style="list-style-type: none"> Sub-assemblies parts: Fenders (Wings), radiators panel, doors, bonnet, boot lid, still etc. Types of door locks should include: safety cam lock zero-torque lock, rotary lock, schonitzer lock and double clause lock. Use correct hand tools e.g. dollies, body spoons, body files, hammers, mallers, twist wrenches etc. should be emphasized. Apply and exercises on cutting and welding method in restoring rusted panels e.g. winds, bottom sills, door panels etc.
7.	<p>Hand Forming Process</p> <ol style="list-style-type: none"> Explain the working principles of the hand wheeling machine and list the operation that can be performed with it and produce templates. make and draw simple double curvature panels. Gusset, brackets and boxes. Make simple double curvature panels. Apply glass fibre reinforced plastics in the repair of damaged panel. Make simple double curvature panels in glass fibre reinforced plastics. 	<ol style="list-style-type: none"> Working principles e.g. Hand wheeling machine etc. Templates: designs and production. Operations: Marking cutting and shaping. The simple double curvature panel e.g. door or roof surface etc. Simple double curvature panels by hollowing and raising e.g. door and roof panel fender (wing) etc. Application glass fibre. Production of simple double curvature panels in glass fibre. 	<ol style="list-style-type: none"> Design and produce a set of templates for use in contour correction operations. Using the hand wheeling machine. Draw and produce gusset, brackets and boxes in mild steel and aluminium alloy up to ten SWG. The making of formers should be part of trainee's experience. Use of glass fibre in double curvature panels.