AUTO BODY REPAIRS AND SPRAY PAINTING

SCHEME OF EXAMINATION

There will be three papers, Papers 1, 2 and 3 all of which must be taken. Papers 1 and 2 will be a composite paper to be taken at one sitting.

Paper 1: will consist of forty multiple-choice objective questions all of which are to be answered in 1 hour for 40 marks.

Paper 2: will consist of five essay questions. Candidates will be required to answer any four in 1½ hours for 60 marks.

Paper 3: will be a practical test of 3 hours, 10 minutes duration. It will consist of one compulsory question for 100 marks.

A list of materials for the test shall be made available to schools not less than two weeks before the paper is taken for material procurement and relevant preparations.

ALTERNATIVE TO PRACTICAL TEST

Alternatively, in the event that materials for the actual practical test cannot be acquired, the Council may consider testing theoretically, candidates' level of acquisition of the practical skills prescribed in the syllabus. For this alternative test, there will be one question to be answered in 3 hours for 100 marks.

DETAILED SYLLABUS

1.	Safety rules and regulations in Auto body repairs and spray painting.	1.1 Definition of safety rules and regulations in auto body repairs and spray painting. 1.2. List of rules and regulations and their importance. 1.3 List of safety tools and equipment/machines for auto body repairs. 1.4 Auto body dressing code: personal protective equipment (nose mask, goggles, boots, ear defender, etc). 1.5 Sources of accident (human factors, machinery/equipment and workshop keeping) and their preventions. 1.6 Factory acts on safety rules and regulations: 1984 amended resource conservation recovery act, environmental protection agency regulations and hazardous waste collection and recycling (solvent recovery system).	1:3:1 Identification of safety tools and equipment and demonstration of their usage. 1:4:1 Identification of dress code and protective equipment and demonstration of their usage. 1:5:1 Identification of containers for hazardous waste. 1:5:2 Demonstration of horse play. 1:5:3 Report faulty machines/ equipment 1:5:4 Demonstration of workshop keeping e.g. cleaning oil and water from the floor with saw dust and dry sand

S/NO.	TOPIC	CONTENT	PRACTICAL
2	Tools and Equipment (a) Basic Hand Tools	2.1 Types of hand tools. (hammers, dollies, spanner, files, ratchets, body spoons, etc) and their uses.	2:1:1 Identification of hand tools and equipment
		2.2 Types and uses of power tools and equipment/machines (drilling machine, body jack, sanders, air compressor, shaping machines, cutting machine, etc).	2:2:1 Identification and demonstration of the use of power tools.
		2.3 Advantages and disadvantages of machines.	
		2.4 Uses of machines and safety precautions.	2:4:1 Demonstration of the use of machine.
	(b) Spray painting tools and equipment.	2.5 Spray painting tools and equipment (scrapers, brushes, funnels, paint pots, spray gun, spraybody filters, air compressor, oven, spray boot, etc).	2:5:1 identification of spray painting tools, equipment and their uses.
	(c) Care and maintenance of tools and equipment.	2.6 Definition of maintenance and types – predictive, preventive and corrective.	
		2.7 Manufacturer's maintenance guide.	
		2.8 Maintenance of tools and equipment.	2:8:1 Dismantling and assembly of a spray gun 2:8:2 Cleaning of tools and equipment

3.	Materials for auto-body repairs and spray painting (a) Auto-body Repairs materials.	3.1 Types of body filler - plastic filler; - fibreglass fillers; - body solder; 30/70 and 40/60.	3:1:1 Identification of body fillers.
		3.2 Type of body abrasives e.g. sand papers, (wet and dry); Sanding disc.	3:2:1 Identification of body abrasives. .
		3.3 Type of sealers e.g. rubber sealers, seam sealers, undercoating, etc.	
		3.4. Rivet pins e.g. pop and solid rivets.	3:4:1 Demonstration of the use of rivet gun.
			3:5:1 Identification of paints by use of thinner.
	(b) Spray painting materials.	3.5 Types of paints – Enamel paints and lacquers.	3:5:2 Demonstration of the use of under coats.
		- Under coats: surface primer, putty/body filler, sealers. - Top coats: lacquers and enamel paints.	3:5:3 Demonstration of those of top coats.
		3.6 Manufactures paint guide: paint formula, paint mixing equipment, custom-mix basecolours, paint labels, colour charts.	3:6:1 Demonstration of how to mix paints 3:6:2 Identification of colours using colour chats

4.	Type of metals.	4.1 Ferrous and non ferrous metals – mild teel, cast iron, aluminium, brass, etc. 4.2 Properties of metals – fusibility, maleability, ductility, weldability, etc. 4.3 Uses of metals on Auto bodies.	4:1:1 Identification of ferrous and non ferrous metals. 4:1:2 Demonstration of properties of metals.

5	Heat treatment of metals.	5.1 Definition of heat treatment. 5.2 Types and process of heat treatment e.g. hardening, annealing, normalizing, case hardening and tempering. 5.3 Importance of heat treatment.	5:2:1 Demonstration of heat treatment processes.

6.	Oxy-acetylene welding and equipment.	6.1 Definition of oxy-acetylene welding. 6.2 Safety precautions 6.3 Oxy-acetylene welding equipment. 6.4 Types of oxy-acetylene gas used e.g.(high and low pressure system). 6.5 Installations of welding equipment. 6.6 Welding nozzles. 6.7 Defects of oxy-acetylene welding – slag inclusion, porosity, crack, lack of penetration, etc and their remedies.	6:3:1 Identification of equipment. 6:4:1 Demonstration of how to use high and low pressure system. 6:5:1 Demonstration of how to assemble welding equipment. 6:6:1 Demonstration of how to install welding equipment. 6:7:1 Identification of weld defects.
7	Auto body repair work (a) Minor auto body repair.	7.1 Types of auto body (i) integral body; (ii) composite body . 7.2 Basic methods of straightening auto body: aligning the metal with power jack, pulling the metal with sledge hammer, using pre bar, pulling the metal with pull	7:1:1 Identification of integral and composite bodies. 7:2:1 Identification of auto- body repair tools. 7:2:2 Identification of heat shrinking

		taps. Heat-shrinking the metal to bring the metal back to its original shape. 7.3 Tools used in-minor repairs hammers, hand dollies, spoons, spanners, screw drivers, etc. 7.4 Major body sections e.g. front engine compartment, passenger section, rear section 7.5 Basic alignment principle. 7.6 Quarter panel cutting. 7.7 Light weight panels. 7.8 Damaged vehicle alignment.	tools. 7:3:1 Demonstration of how to use the tools in carrying out minor repairs. 7:4:1 Identification of major body sections. 7:6:1 Identification of quarter panel and demonstration of how to cut it. 7:7:1 Repair and aligning of body sections.
	(b) Major auto body repair.		
8.	Aluminum panel repair.	8.1 Steps involved in aluminum panel repair. 8.2 Repair and alignment of damaged aluminum panel. 8.3 Aluminum deck lid repair.	8:2:1 Demonstration of how to repair and align aluminum panel. 8:3:1 Aluminum deck lid repair procedure
9.	Plastic repairs.	9.1 Precautions while working with plastics. 9.2 Types of plastic resins (thermosetting and thermoplastic). 9.3 Repair of plastic parts by melting. 9.4 Introduction to glass fibre panel repair.	9:2:1 Identification of plastics. 9:3:1 Demonstration of how to repair plastics parts by melting.

10.	Spray painting: (a) Spray gun and accessories.	10.1 Spray gun – pressure feed gun siphon and gravity gun. 10.2 Spray gun parts – air cap, fluid needle, air valve, trigger gun, body, cup, etc. 10.3 Precautions in the use of spray gun. 10.4 Manufacturer's maintenance guide.	10:1:1 Identification of pressure feed gun, siphon gun and gravity gun.
	(b) Surface preparation.	10.5 Preparation of surfaces for spray painting.	10:5:1 Preparation of metal surfaces for spray painting.
	(c) Type of paints.	10.6 Paints used on auto bodies cellulose synthetic paint, enamel paint, acrylic, metallic paints, etc.	10:6:1 Identification of paints used on auto bodies.
	(d) Metallic paint.	10.7 Importance of manufacturer's paint code. 10.8 Special paints and their importance. 10.9 Variable agents (flakes and pigments). 10.10 Metallic spray techniques (wet and dry spray).	10:10:1 Demonstration of metallic spray techniques.
11.	Auto body workshop business.	11.1 Factors to consider in locating auto body repair shop – capital, accessibility, land, etc. 11.2 List of tools and equipment.	

RECOMMENDED READING LIST

1. The repair of vehicle bodies by Alan Robinson (3rd Edition).

2. Fundamentals of vehicle body work by J. Fairbrother.

3. Practical welding (The motivate series Mac-Milan texts for Industrial Vocational and Technical Education) by S. Gibson.

4. Fundamentals of motor vehicle technology, chassis and body electronics (5th Edition) Book 1, 2, and 3 by Hilliers V. A. W. and David R. Rogers.

5. Bodywork Maintenance and repair including interiors by Paul Browne.

6. Automotive encyclopedia by Good heart-Willcox.

7. Auto body repair and repainting by Bill Tobold.