

AUTO BODY REPAIRS AND SPRAY PAINTING

SCHEME OF EXAMINATION

The examination shall consist of three papers, Papers 1, 2 and 3; all of which must be taken. Papers 1 and 2 will be a composite one and will be taken at one sitting.

- Paper 1: This paper will consist of forty multiple choice objective questions. Candidates will be allowed 1 hour to answer all the questions in the paper for 40 marks.
- Paper 2: This will consist of five essay questions. Candidates will be required to answer any four of them in 1½ hours for 60 marks.
- Paper 3: This will be a practical test containing one question. Candidates will be required to answer the question within 3 hours for 100 marks. Extra 10 minutes shall be given, prior to the commencement of the examination, for candidates to study the drawings.

A list detailing materials needed for the test shall be made available to schools not less than two weeks before the paper is taken, to enable schools make adequate preparations.

Alternatively, Council may consider testing candidates' practical capabilities in the subject using the alternative to practical work method in the event of constraints on requisite facilities. In that case, there shall still be one question for candidates to answer within 3 hours for 100 marks for. The question shall test candidates' real time experience in the workshop, safe use of tools, marking out, processing parts to specification, materials usage and freehand sketches of projects, tools and machines relating to auto body repairs and spray painting.

DETAILED SYLLABUS

1.	Safety rules and regulations in Auto body repairs and spray painting.	<p>1.1 Definition of safety rules and regulations in auto body repairs and spray painting.</p> <p>1.2. List of rules and regulations and their importance.</p> <p>1.3 List of safety tools and equipment/machines for auto body repairs.</p> <p>1.4 Auto body dressing code: personal protective equipment (nose mask, goggles, boots, ear defender, etc).</p> <p>1.5 Sources of accident (human factors, machinery/equipment and workshop keeping) and their preventions.</p> <p>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).</p>	<p>1:3:1 Identification of safety tools and equipment and demonstration of their usage.</p> <p>1:4:1 Identification of dress code and protective equipment and demonstration of their usage.</p> <p>1:5:1 Identification of containers for hazardous waste.</p> <p>1:5:2 Demonstration of horse play.</p> <p>1:5:3 Report faulty machines/ equipment</p> <p>1:5:4 Demonstration of workshop keeping e.g. cleaning oil and water from the floor with saw dust and dry sand</p>
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S/NO.	TOPIC	CONTENT	PRACTICAL
2	Tools and Equipment (a) Basic Hand Tools (b) Spray painting tools and equipment. (c) Care and maintenance of tools and equipment.	2.1 Types of hand tools. (hammers, dollies, spanner, files, ratchets, body spoons, etc) and their uses. 2.2 Types and uses of power tools and equipment/machines (drilling machine, body jack, sanders, air compressor, shaping machines, cutting machine, etc). 2.3 Advantages and disadvantages of machines. 2.4 Uses of machines and safety precautions. 2.5 Spray painting tools and equipment (scrapers, brushes, funnels, paint pots, spray gun, spraybody filters, air compressor, oven, spray boot, etc). 2.6 Definition of maintenance and types – predictive, preventive and corrective. 2.7 Manufacturer’s maintenance guide. 2.8 Maintenance of tools and equipment.	2:1:1 Identification of hand tools and equipment 2:2:1 Identification and demonstration of the use of power tools. 2:4:1 Demonstration of the use of machine. 2:5:1 identification of spray painting tools, equipment and their uses. 2:8:1 Dismantling and assembly of a spray gun 2:8:2 Cleaning of tools and equipment

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.	5:2:1 Demonstration of heat treatment processes.
		5.3 Importance of heat treatment.	
6.	Oxy-acetylene welding and equipment.	6.1 Definition of oxy-acetylene welding.	
		6.2 Safety precautions	
		6.3 Oxy-acetylene welding equipment.	6:3:1 Identification of equipment.
		6.4 Types of oxy-acetylene gas used e.g.(high and low pressure system).	6:4:1 Demonstration of how to use high and low pressure system.
		6.5 Installations of welding equipment.	6:5:1 Demonstration of how to assemble welding equipment.
		6.6 Welding nozzles.	6:6:1 Demonstration of how to install welding equipment.
		6.7 Defects of oxy-acetylene welding – slag inclusion, porosity, crack, lack of penetration, etc and their remedies.	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 .	7:1:1 Identification of integral and composite bodies.
		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	7:2:1 Identification of auto- body repair tools. 7:2:2 Identification of heat shrinking

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

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

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.