

-SQA-SCOTTISH QUALIFICATIONS AUTHORITY

**Hanover House
24 Douglas Street
GLASGOW G2 7NQ**

NATIONAL CERTIFICATE MODULE DESCRIPTOR

-Module Number- 0094387 -Session- 1989-90
-Superclass- XS

-Title- SPARK IGNITION (C.B. SYSTEMS): CONDITION ASSESSMENT AND FAULT DIAGNOSIS (x 1/2)

-DESCRIPTION-

Purpose This module is designed to develop the skills and knowledge required to diagnose faults in spark ignition C.B. Systems and to accurately assess the condition of related components.

It is aimed at those intending to pursue a career in the motor vehicle repair industry. The module is also designed to complement RTITB module LV115C Spark Ignition C.B. Systems: Condition Assessment and Fault Diagnosis and will provide the student with the necessary knowledge and skills to prepare for the RTITB Skills Test. It should be noted however that adequate supporting industrial experience will also be necessary.

Preferred Entry Level 94386 Spark Ignition (C.B. Systems): Removal, Replacement and Adjustment of Components

Learning Outcomes The student should:

1. visually inspect and report on ignition system defects;
2. test the operation of automatic advance and retard mechanisms;
3. use electrical measuring instruments to compare component performance;
4. use electronic diagnostic equipment;
5. recognise ignition system faults.

Content/ Context	Safety regulations, safe working practices and procedures should be observed at all times.
	<u>Corresponding to Learning Outcomes 1-5:</u>
	This module should be taught in the context most suited to the student's particular needs.
	This module is intended to give students an understanding of the reasons for assessing the condition and diagnosing defects in vehicle ignition systems, as a means of promoting vehicle safety, prolonging operational life and maintaining to original specification.
Suggested Learning and Teaching Approaches	This module should be undertaken in a service workshop with an adequate range of vehicles and or running engines and components to be covered. Students should have full access to relevant service publications, special tools and test equipment for the satisfactory performance of the tasks.
Assessment Procedures	Acceptable performance in the module will be satisfactory achievement of all the performance criteria specified for each Learning Outcome.
	The following abbreviations are used below:
	LO Learning Outcome IA Instrument of Assessment PC Performance Criteria
LO1	VISUALLY INSPECT AND REPORT ON IGNITION SYSTEM DEFECTS
	PC The student: <ol style="list-style-type: none"> (a) inspects and reports on contact breaker points for common faults; (b) inspects and reports on condition of vacuum advance/retard unit; (c) visually checks and reports on the operation of the mechanical advance/retard mechanism; (d) inspects and reports on components for possible causes of shorting and tracking.

IA Practical Exercise

The student will be presented with a series of practical exercises set in a workshop environment to test the application of knowledge and skills involved in the visual inspection of ignition systems. The exercise will consist of visual inspection and report on the following:

- (i) two sets of C.B. points
- (ii) two vacuum advance/retard units
- (iii) two mechanical advance/retard units
- (iv) shorting and tracking e.g. plug leads, terminals, distributor cap, rotor arm, coil tower and main high tension lead

One item in each of the categories (i) to (iv) should have a defect.

Satisfactory achievement of the Learning Outcome will be based on all performance criteria being met. This will be demonstrated by correct identification of faults on the defective components and accurate completion of a report on the defective components.

LO2

TEST THE OPERATION OF AUTOMATIC ADVANCE AND RETARD MECHANISM

PC The student:

- (a) uses literature to obtain mechanical and vacuum advance and retard specifications;
- (b) uses instruments to check and adjust idling speed, dwell angle and timing;
- (c) uses instruments to check mechanical advance at recommended speeds;
- (d) uses instruments to check vacuum and total advance.

IA Practical Exercises

The student will be presented with a series of practical exercises set in a workshop environment to test the application of knowledge and skills involved in the testing of automatic advance and retard mechanisms.

The exercises will consist of obtaining and recording technical data, measuring and recording the following:

- (i) idling speed, dwell angle and ignition timing
- (ii) mechanical, vacuum and total advance

Satisfactory achievement of the Learning Outcome will be based on all performance criteria being met. This will be demonstrated by accurate recording of manufacturers' data, and readings obtained for performance criteria 'b', 'c' and 'd'.

LO3

USE ELECTRICAL MEASURING INSTRUMENTS TO COMPARE COMPONENT PERFORMANCE

PC The student:

- (a) uses literature to obtain recommended, current, resistance and voltage readings;
- (b) measures current consumption;
- (c) measures component resistances;
- (d) measures terminal voltages;
- (e) measures voltage drop.

IA Practical Exercises

The student will be presented with a series of practical exercises set in a workshop environment to test the application of knowledge and skills involved in the use of electrical measuring instruments. The test will consist of obtaining, recording and measuring the following:

- (i) primary current consumption
- (ii) component resistances to include H.T. Leads, C.B. points, high/low voltage coils (both windings), ballast resistors
- (iii) terminal voltages to include battery and coil (low tension)
- (iv) volts drop across C.B. points

Satisfactory achievement of the Learning Outcome will be based on all performance criteria being met. This will be demonstrated by accurate recording of manufacturers' data, and readings obtained for performance criteria 'b', 'c', 'd' and 'e'.

LO4

USE ELECTRONIC DIAGNOSTIC EQUIPMENT

PC The student:

- (a) demonstrates the ability to connect the equipment to the vehicle;
- (b) completes a full sequence of primary circuit tests as given in equipment manufacturers instructions;
- (c) completes a full sequence of secondary circuit tests as given in equipment manufacturers' instructions;
- (d) identifies primary and secondary circuit faults;
- (e) follows all safe working practices relevant to the task;
- (f) uses vehicle protection appropriate to the task.

IA Practical Exercise

The student will be presented with a series of practical exercises in a workshop environment to test the application of knowledge and skills relating to the use of electronic diagnostic equipment in accordance with recommended procedures. These procedures may be found in a variety of technical publications including equipment manufacturers' manuals and service bulletins.

A minimum of one fault should be present in the primary and secondary circuits which must allow the engine to run and be measurable or indicate on the test equipment used.

Satisfactory achievement of the Learning Outcome will be based on all performance criteria being met. This will be demonstrated by the student producing a completed assignment sheet/equipment manufacturers' customer report with comments on faults found.

LO5

RECOGNISE IGNITION SYSTEM FAULTS

PC The student:

- (a) identifies common ignition system faults;
- (b) identifies effects of ignition system faults;
- (c) identifies causes of ignition system faults.

IA Structured Question

The student will be presented with a structured question to test the understanding of knowledge relating to the recognition and diagnosis of ignition system faults.

The test will consist of one structured question relating to the faults in ignition systems.

The question will have 3 parts allocated as follows:

- (i) identification of 5 faults
- (ii) effects of 5 faults
- (iii) causes of 5 faults

Satisfactory achievement of the learning outcome will be based on all performance criteria being met. This will be demonstrated by the student producing at least 4 correct responses for each of parts (i), (ii) and (iii) above.