-SQA-SCOTTISH QUALIFICATIONS AUTHORITY

Hanover House
24 Douglas Street
GLASGOW G2 7NQ

NATIONAL CERTIFICATE MODULE DESCRIPTOR

-Module Number- **0064432** **-Session-1986-87**

-Superclass- **XS**

-Title- **SPARK IGNITION, ENGINE IGNITION AND FUEL SYSTEMS 2 (x $^{1}/_{2}$)**

-DESCRIPTION-

Type and Purpose

A specialist module ($^{1}/_{2}$) which introduces the student to petrol injection and electronic ignition systems fitted to road vehicles.

Preferred Entry Level

04431 Spark Ignition Engine and Fuel Systems 1

Learning Outcome

The student should:

1. know the components and operation of a petrol injection system and relate to the manufacturers' service information;
2. know the components and operation of electronic ignition systems and relate to the manufacturers' service information;
3. know the components and operation of pressure charging installations on spark ignition engines;
4. work in a safe manner.

Content/ Context

Corresponding to the Learning Outcomes:

1. review of petrol injection systems and their advantages. Layout and operation of an electronic petrol injection system. Identification of components and their functions. Operational adjustments of injection system.

2. introduction to electronic ignition systems using:

   (a) transistor assisted contacts;
   (b) photocell/photoelectric triggering;
   (c) magnetic breakerless system;
   (d) capacitor discharge system.

   Operational adjustments of electronic ignition systems.

3. Construction and operation of engine pressure charging system using carburettors and petrol injection with:

   (a) engine driven superchargers;
   (b) exhaust driven turbochargers;
   (c) intercoolers;
   (d) wastegates and dump valves.

   Advantages and disadvantages of various installations.

4. safe working practices when working with electronics systems inflammable fuels and running engines.

Suggested Learning and Teaching Approaches

The emphasis should be on understanding the principles and operation of these more specialised systems to provide a basis for appreciating developments in spark ignition engine fuel and ignition systems.

Pressure charging using engine driven superchargers need not be demonstrated but a turbo charging system with petrol injection and electronic ignition should be available to demonstrate and test.

The specialised nature of these systems requires increased use of demonstration techniques in teaching but students must have every opportunity to test and adjust the units, using modern methods.

Emphasis must be given to the need for special care when dealing with electronic systems.

Assessment Procedures

All learning outcomes must be validly assessed.

The student must be informed of the tasks which contribute to summative assessment. Any unsatisfactory aspects of performance should, if possible be discussed with the student as and when they arise.

Acceptable performance in the module will be satisfactory achievement of 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

IA Observation checklist.

PC The student correctly:

(a) identifies the components of a petrol injection system;

(b) relates service information to the actual injection system;

(c) adjusts idling speed using a tachometer;

(d) adjusts mixture settings using an e.g.a.

LO2

IA Observation checklist.

PC The student correctly:

(a) identifies the components of an electronic ignition system;

(b) checks and adjusts stroboscopic timing;

(c) checks automatic advance/retard of ignition timing.

LO3

IA Observation checklist.

PC The student correctly:

(a) identifies a turbocharger and its control system;

(b) checks boost pressure of a turbocharger.

LO4

IA Observation checklist.

PC The student consistently;

(a) uses tools and equipment safely;

(b) uses protective/safety equipment;

(c) behaves in a manner appropriate to the working environment.

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