-SQA- SCOTTISH QUALIFICATIONS AUTHORITY

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NATIONAL CERTIFICATE MODULE DESCRIPTOR

-Module Number-	**2210400**	**-Session-1990-91**
-Superclass-	**XS**	

-Title-	**TORQUE CONVERTOR AND AUTOMATIC GEARBOX: REMOVAL, REPLACEMENT AND ADJUSTMENT OF COMPONENTS**

-DESCRIPTION-

Purpose	This module is designed to develop the necessary skills and knowledge required to carry out removal, replacement and adjustment of a torque convertor and automatic gearbox. 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 LV223B Transmission System: Torque Convertor and Automatic Gearbox: Removal, Replacement and Adjustment of Components and will provide the student with the necessary knowledge and skills to prepare for the RTITB skills test. It should be noted that adequate supporting industrial experience will also be necessary.
Preferred Entry Level	Modules numbered 94370 through 94377 inclusive and 2210450.
Outcomes	The student should: 1. identify torque convertor and automatic gearbox components by name, function and location; 2. outline the operation of the torque convertor and automatic gearbox components; 3. remove and replace torque convertor and automatic gearbox components; 4. measure, set and adjust torque convertor and automatic gearbox components and linkages.

Assessment Procedures

Acceptable performance in the module will be satisfactory achievement of all the Performance Criteria specified for each Outcome.

The following abbreviations are used below:

PC Performance Criteria
IA Instrument of Assessment

Note: The Outcomes and PCs are mandatory and cannot be altered. The IA may be altered by arrangement with SQA. (Where a range of performance is indicated, this should be regarded as an extension of the PCs and is therefore mandatory).

OUTCOME 1 **IDENTIFY TORQUE CONVERTOR AND AUTOMATIC GEARBOX COMPONENTS BY NAME, FUNCTION AND LOCATION**

PCs

(a) The components of the torque convertor assembly are correctly named.
(b) The function and location of torque convertor components are correctly stated.
(c) The components of the automatic gearbox assembly are correctly named.
(d) The function and location of automatic gearbox components are correctly stated.

IA Objective Test

The student will be presented with an objective test to test the recall of knowledge relating to torque convertor and automatic gearbox layout and functions.

The test will consist of 30 items comprised of:

(I) Location of components (10)
(ii) Name of components (10)
(iii) Function of components (10)

A diagram combining the torque convertor with the automatic gearbox could be used, with the components numbered 1 to 10 in random order. The components must be taken from the following:

impeller
turbine
stator
one-way clutch (TC)
oil pump
servos
multi-plate clutches
brake bands
gear train
one-way clutch (gear box)
governor
valve assembly

Satisfactory achievement of the Outcome will be based on all Performance Criteria being met. This will be demonstrated by the student producing at least the same 7 correct responses from 1, 2 and 3 above.

OUTCOME 2 **OUTLINE THE OPERATION OF THE TORQUE CONVERTOR AND AUTOMATIC GEARBOX COMPONENTS**

PCs

(a) The outline of the operating principles of the torque convertor is correct.
(b) The outline of the mechanical operating principles of the automatic gearbox is correct.
(c) The outline the hydraulic operating principles of the automatic gearbox is correct.
(d) The outline of the mechanical and hydraulic components engaged inside the gearbox for forward gears and reverse is correct.

IA Objective Test

The student will be presented with an objective test to test the recall of knowledge relating to the operating principles of the torque convertor and automatic gearbox components:

The test will consist of 15 short answer questions allocated as follows:

(a)	operating principles of torque convertor	2
(b)	mechanical operating principles of automatic gearbox	4
(c)	hydraulic operating principles of automatic gearbox	3
(d)	components engaged inside gearbox for forward gears and reverse	6

Satisfactory achievement of the Outcome will be based on all Performance Criteria being met. This will be demonstrated by the student producing at least 1 correct response from (a), 3 from (b), 2 from (c) and 5 from (d) above.

OUTCOME 3 **REMOVE AND REPLACE TORQUE CONVERTOR AND AUTOMATIC GEARBOX COMPONENTS**

PCs

(a) Recommended procedures outlined in technical data for carrying out each task are followed.
(b) Safe working practices relevant to the task are followed.

(c) Vehicle protection as appropriate to the task is used.
(d) Tools appropriate to the task are used.

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 removal and replacement of torque convertor and automatic gearbox components.

Each student should undertake all of the following tasks:

(i) removal and replacement of torque convertor
(ii) removal and replacement of automatic gearbox
(iii) dismantling and assembly of an automatic gearbox

Satisfactory achievement of the Learning Outcome will be based on all Performance Criteria being met, for all tasks. A suitable checklist will be used to record student performance.

OUTCOME 4 MEASURE, SET AND ADJUST TORQUE CONVERTOR AND AUTOMATIC GEARBOX COMPONENTS AND LINKAGES

PCs
(a) Recommended procedures outlined in technical data for carrying out each task are followed.
(b) Safe working practices relevant to the task are followed.
(c) Vehicle protection as appropriate to the task is used.
(d) Tools appropriate to the task are used.

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 measuring, setting and adjusting torque convertor and automatic gearbox components and linkages, in accordance with recommended procedures. These procedures may be found in a variety of technical publications including manufacturers' workshop manuals and service bulletins. Each student should undertake all of the following tasks:

(i) stall test on torque convertor and automatic gearbox
(ii) adjust brake bands
(iii) adjust brake band servos, if applicable
(iv) adjust accelerator cables and linkages
(v) adjust kick-down cables and linkages
(vi) adjust selector lever and linkages

(vii) adjust inhibitor switch
(viii) measure and set pre-load or end float of transmission shafts and gear assemblies
(ix) measure and set pump shaft end float, if applicable
(x) measure and adjust thrust washer and shim thicknesses

Satisfactory achievement of the Outcome will be based on all Performance Criteria being met, for all tasks. A suitable checklist will be used to record student performance.

The following sections of the descriptor are offered as guidance.
They are not mandatory.

CONTENT/CONTEXT

Safety regulations, safe working practices and procedures should be observed at all times.

Corresponding to Outcomes 1-4:

This module should be taught in the context most suited to the students' particular needs.

This module is intended to give students an understanding of the reasons for servicing of vehicle automatic transmission 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 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.

09/02/98 JH/PB