

201011T337



# higher education & training

Department:  
Higher Education and Training  
**REPUBLIC OF SOUTH AFRICA**

**T1760(E)(N16)T  
NOVEMBER 2010**

**NATIONAL CERTIFICATE**

**MOTOR TRADE THEORY N3**

**(11040673)**

**16 November (X-Paper)  
09:00 – 12:00**

**Calculators may be used.**

**This question paper consists of 4 pages.**



INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions.
2. Read ALL the questions carefully.
3. Number the answers correctly according to the numbering system used in this question paper.
4. Start each question on a NEW page.
5. FORMULAE:  

$$V_s = \frac{\pi D^2}{4} \times SL$$

$$C.R. = \frac{V_s + V_c}{V_c}$$

$$N = 1 - \frac{1}{r^{0.4}}$$

$$h = \frac{SL}{CR - 1}$$
6. Write neatly and legibly.

QUESTION 1

- 1.1 Name FIVE methods that can be used to increase the volumetric efficiency of an engine. (5)
- 1.2 State FIVE factors that will influence the volumetric efficiency of an engine. (5)
- 1.3 Show ALL the steps and calculate the compression ratio of an engine with an air standard efficiency of 60%. (7)
- 1.4 An engine has a compression ratio of 10:1, the stroke length is 80 mm and the free volume is 20 000 mm<sup>3</sup>. Show ALL the steps and do the following:  
 1.4.1 Calculate the stroke volume. (4)  
 1.4.2 Calculate the diameter of the bore. (4)

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## QUESTION 2

- 2.1 Name the THREE main components of a torque converter. (3)
- 2.2 State THREE advantages of using double valve springs. (3)
- 2.3 What is meant by the term *cylinder power balance*? (2)
- 2.4 What is the difference between compression pressure and compression ratio on an engine? (2)
- 2.5 State FOUR advantages of electronic ignition systems when it is compared with conventional points operated ignition systems. (4)
- 2.6 Describe the operation of an electronic ignition system that is points operated. (7)
- 2.7 Name TWO types of valve rotators. (2)
- 2.8 State TWO disadvantages of sodium-filled valves. (2)

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## QUESTION 3

- 3.1 State FIVE factors that will help to improve the efficiency of a garage. (5)
- 3.2 Tabulate FIVE differences between a fluid coupling and a torque converter. (5)
- 3.3 State THREE advantages of a torque converter when it is compared with a fluid coupling. (3)
- 3.4 State THREE advantages of fluid coupling when it is compared with a torque converter. (3)
- 3.5 State FIVE of the qualifications which a secretary must have. (5)
- 3.6 State FOUR advantages that double overhead cam engines have when compared with single overhead cam engines. (4)

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**QUESTION 4**

- 4.1 State FIVE disadvantages of power steering systems when compared with conventional steering systems. (5)
- 4.2 Describe the power flow through a limited slip differential when one wheel starts slipping. (6)
- 4.3 Describe the operation of the hydraulic control valve in an automatic gearbox. (14)

**[25]****TOTAL: 100**

